THE MEDICAL JOURNAL OF AUSTRALIA

VOL. I.—31ST YEAR. SYDNEY, SATURDAY, MAY 20, 1944. No. 21.

Table of Contents.

EOSINOPHILIA IN TROPICAL DISEASE: EXPERIENCES AT AN AUSTRALIAN GENERAL HOSPITAL.

By T. E. LOWE, M.D., M.R.C.P., F.R.A.C.P.,

Major, Australian Army Medical Corps, Australia.

DURING the past nine months at an Australian general hospital my colleagues and I have investigated the blood picture of a large number of men returned from service in tropical areas. These men had been exposed to infection with tropical diseases for only a few months, and had returned from the tropics for a sufficient time to ensure that they had had no recent reinfection. Most suffered from more than one tropical illness; combinations of malaria and helminth infestations, for example, were frequent.

These unusual circumstances have permitted observations on the individual and combined effects of various tropical diseases on the eosinophile picture. As little is known of the behaviour and significance of the eosinophile series of leucocytes, these observations are worthy of record.

For comparison with these tropical affections, the eosinophile counts in a series of normal subjects were obtained by examination of 100 healthy women of a similar age group. The majority of these women had lived in urban areas of south Queensland for the past five years, and none had had any tropical experience in that period. The distribution of the eosinophile counts in this control series is shown in Table I. The average reading is 145 per cubic millimetre, and the range is from 0 to 700 cells per cubic millimetre.

The results of these investigations may be discussed conveniently under the headings of malaria infection, helminth infestation and unexplained eosinophilia.

TABLE I.

Eosinophile Cell Distributions.

Subjects.	Range. (Cells per Cubic Millimetre.)	Average. (Cells per Cubic Millimetre.)
Normal controls (100)	0– 700	145
Malaria convalescents (100)	0– 1,350	250
Malaria convalescents with *Trichocephalus* (11)	240– 1,700	710
Malaria convalescents with hookworm (200)	0–12,500	1,800
Malaria convalescents with *Strongyloides* (8)	1,100– 5,300	2,570

Malaria.

Patients convalescent from malarial attacks, but in whom no helminth infestation can be found, frequently show some degree of eosinophilia. A series of 100 such patients was examined, and the distribution of eosinophile cell counts is recorded in Table I. They range between 0 and 1,350 cells per cubic millimetre, with an average figure of 250. Observations on additional selected cases suggest that the upper limit of eosinophilia in these cases may be of the order of 1,750 cells per cubic millimetre. In a few cases the course of this eosinophilia was recorded over several weeks. It diminished as time progressed, but lasted for at least eight weeks. This convalescent post-malarial eosinophilia must be remembered when one is considering the effects of other associated infections on the eosinophile series of leucocytes.

Before the febrile phase of a malarial attack, a depression in the number of eosinophile cells occurs, and this is most readily seen in the presence of an already existent eosinophilia due to malarial or helminth infection. In these patients a pronounced fall in the number of circulating eosinophile cells occurs some twenty-four to thirty-six hours before the onset of malarial symptoms. This has been observed in almost all cases examined; but

records of only twelve are sufficiently complete to present the picture over a period of several weeks. The average values of the eosinophile count in these cases before, during and after a rigor are shown graphically in Figure I, and indicate that the eosinophile cell count falls by some 50% at the time of the relapse. After the febrile period, in cases in which treatment is given, the eosinophile cell count rises and regains its previous level in about ten days, and in a proportion of cases (Table I) it continues to rise. The prefebrile fall is also illustrated in Case II, in which the eosinophile cell count fell from 17,500 to 2,420 cells per cubic millimetre with the onset of a malarial relapse.

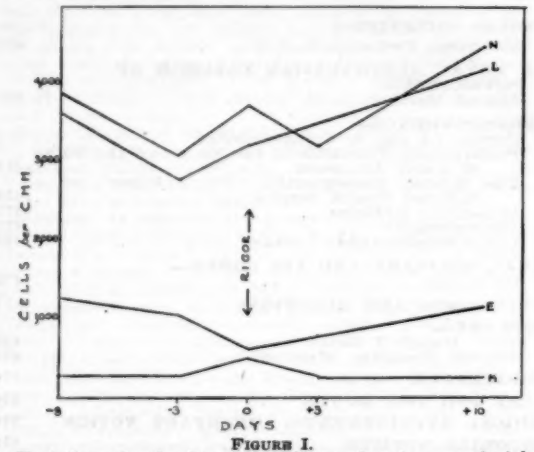

FIGURE I.
Variations in the leucocyte picture due to a malarial attack (average of 12 hookworm cases). E = eosinophile cells, L = lymphocytes, M = monocytes, N = neutrophile cells.

Helminth Infestations.

The three common helminths which have been found in these patients are hookworm, *Trichocephalus trichiurus* and *Strongyloides stercoralis*. Their effects are discussed individually.

Hookworm.

In a previous paper,[a] the eosinophilia associated with early hookworm infestation in malarial patients was discussed. The average eosinophile cell count in 200 cases was 1,800 per cubic millimetre, with a range of from 0 to 12,500 cells per cubic millimetre (Table I). As the values recorded are far above those of the post-malarial eosinophile reaction, they indicate an absolute eosinophilia due to hookworm infestation. The infestation of these patients was low in degree and of not more than nine months' duration. As they had not been exposed to reinfection for many weeks, it may be assumed that the eosinophilia is due to the presence of adult worms in the intestinal canal. Its disappearance, after the removal of these adult worms, is confirmatory evidence of this conclusion.

Detailed records of 74 cases in which, after treatment, no ova were found in the fæces on repeated examination, make it possible to comment upon the rate at which the eosinophilia disappears. Although these patients were convalescent from malaria, during the periods of observation none had malarial relapses to complicate the eosinophile cell picture.

Table II summarizes the findings and indicates that two groups are discernible; the first consists of 51 cases, in which the eosinophile cell count fell rapidly from the time of treatment and reached normal limits about the fifth week, and the second consists of 23 cases, in which the fall did not commence so rapidly, so that at the end of four weeks a substantial eosinophilia was still present. Subsequent observations in some of these 23 cases show that the eosinophilia disappeared without any further treatment. The following case may be taken as typical of this second group:

CASE I.—W.G., convalescent from malaria, was treated for hookworm infestation on April 22, 1943. He had no further relapses of malaria, and subsequent to the treatment for hookworm infestation, no ova were at any time found in the fæces. The eosinophile cell counts were as follows:

April 15, 1943: 4,300 cells per cubic millimetre.
April 27, 1943: 4,950 cells per cubic millimetre.
May 15, 1943: 2,470 cells per cubic millimetre.
August 10, 1943: 765 cells per cubic millimetre.

Although these results suggest two distinct types of response to treatment, no other clinical differences were noted between the two types of case. No significant difference is apparent in a comparison between the average eosinophile cell counts in the two types of case prior to treatment (Table II). Sufficient records are not available to make a definite statement on the relationship between the degree of eosinophilia and the number of worms infesting the host; but the impression gained is that no simple association is present.

TABLE II.
Average Eosinophile Cell Count in Hookworm Infestations after Treatment (Cells per Cubic Millimetre).

Group A.[1]					Group B.[2]
Before Treatment.	After Treatment.				Before Treatment.
	7 Days.	14 Days.	21 Days.	28 Days.	
1,420 (48 cases)	1,080 (40 cases)	920 (25 cases)	875 (14 cases)	620 (15 cases)	1,860

[1] Group A: Eosinophilia disappearing in four weeks (51 cases).
[2] Group B: Eosinophilia not disappearing in four weeks (23 cases).

The general relationship between hookworm infestation and eosinophilia is clear. In these cases the eosinophilia has been due to the presence of adult worms in the intestinal canal, and has an average figure of 1,800 cells per cubic millimetre. After effective treatment, in two-thirds of the cases the eosinophilia has disappeared within four weeks; but in the remaining one-third it has persisted for much longer periods.

Trichocephalus.

In the course of these routine investigations a number of cases of symptomless infestation with *Trichocephalus* were discovered. The records of eleven uncomplicated cases (Table I) among malaria convalescents show a range of eosinophile cell counts between 240 and 1,700 cells per cubic millimetre. Although the average of these figures is higher than that for subjects convalescent from malaria, it is within the range of post-malarial eosinophilia, so that *Trichocephalus*, in these cases, cannot be considered as a frequent cause of significant eosinophilia.

Strongyloides.

Sixteen cases of infestation with *Strongyloides stercoralis*, in all of which pronounced eosinophilia was present, were investigated. Eight of these patients had coexistent infestation with other helminths, and twelve were convalescent from malaria. In these cases the number of eosinophile cells ranged from 1,100 to 12,600 per cubic millimetre, the average figure being 4,300. Coexistent helminth infestations and malarial infections probably contributed to this rise in the number of eosinophile cells. In the eight cases (Table I) not associated with other helminthic infestation (all the patients were convalescent from malaria), the range of eosinophile cells was 1,100 to 5,300 per cubic millimetre, with an average of 2,570. It is thought, however, that the post-malarial eosinophilia did not materially affect this picture, since the eosinophile cell count did not fall during the weeks of observation, as would have been expected if the post-malarial phase was contributing greatly to the condition.

A few cases of infestation with *Ascaris lumbricoides* have been observed; they are associated with eosinophile cell counts of the same order as those accompanying *Strongyloides* infestation.

Unexplained Eosinophilia.

Fourteen patients convalescent from malaria (Table III) have shown a persistent eosinophilia, for which no adequate explanation can be offered. Examination of the records of the serial eosinophile cell counts in these cases shows considerable uniformity amongst them. These records are not published in detail, owing to lack of space, but are summarized in Table III. The majority of the figures lie between 1,000 and 3,000 cells per cubic millimetre, and there is, in general, no tendency for the eosinophilia to disappear. The effects of malarial relapses are also shown in these figures, for of the eight readings below 1,000 cells per cubic millimetre, six are associated with a malarial relapse. Apart from the eosinophilia, the absolute leucocyte counts conform to those seen in patients convalescent from malaria. In no case has any helminth or other parasitic infestation been demonstrated.

TABLE III.

Average Eosinophile Cell and Leucocyte Counts in 14 Cases of Unexplained Eosinophilia, over a Period of 8·5 Weeks.

Observation.	Number of Cells per Cubic Millimetre.	
	Maximum.	Minimum.
Average eosinophile cell count	2,800	1,300
Average leucocyte count	12,800	9,300

The existence of eosinophilia not associated with obvious parasitic infestation in persons who have lived in the tropics is well recognized; but it has often been assumed to be due to the presence of undetected helminths. In the cases studied this appears to be an unlikely explanation, as careful search, including cultural examination of the fæces for larvæ and repeated blood examinations for parasites such as filaria, has in all cases failed to reveal the presence of any intestinal or blood parasite except those of malaria. All these patients were empirically treated with anthelminthic drugs without reduction in the eosinophilia. The group of fourteen cases described shows sufficient uniformity in the blood picture to suggest one causal agent common to them all.

In addition to the foregoing group of cases, one patient (Case II) had an exceptionally high persistent eosinophilia for which no satisfactory explanation has been found.

CASE II.—J.H.C. was admitted to hospital with an attack of benign tertian malaria. Routine investigation revealed pronounced eosinophilia (18,000 cells per cubic millimetre), which persisted except at the time of a subsequent recurrence of benign tertian malaria, when the eosinophile cell count fell to 2,420 cells per cubic millimetre.

During the sixteen weeks of observation he felt in ill health, and complained of a cough with a little sputum. Physical examination revealed some persistent enlargement and tenderness of the liver, and moist adventitiæ were heard consistently at the back of both lungs. Radiographic examination of the lungs revealed at first a general increase in the broncho-vascular markings of the lower and middle zones, but this largely disappeared after some weeks. Sputum examinations revealed no larvæ or tubercle bacilli. Routine anthelminthic treatment did not affect the eosinophile cell count or relieve his symptoms. The blood picture, shown in Table IV, indicates that the cell predominantly affected is the eosinophile cell, and that these cells reached a maximum number of 22,425 per cubic millimetre. Except during malarial attacks, the patient was afebrile throughout the period of observation.

A smear of bone marrow was prepared from a sternal puncture on September 22, 1943, the day on which a malarial rigor occurred. In this were found benign tertian malaria trophozoites, but the only deviation from normal in the cell picture was an excess of eosinophile myelocytes and eosinophile polymorphonuclear cells, which respectively formed 9·2% and 18·6% of the cells.

Patients with eosinophile leuchæmia or the tropical eosinophilia of Weingarten[3] may have eosinophile cell counts of this order. In the case of J.H.C., either of these diagnoses is unlikely—the former because the cells in the bone marrow are normal, and the latter because of the absence of obvious lung involvement and the afebrile course of the illness. This case is therefore classed as one of "unexplained eosinophilia".

Commentary.

In a previous paper, it has been shown that the eosinophilia associated with hookworm infestation is independent of changes in the distribution of other types of leucocyte. The figures in the graph (Figure I) and the behaviour of the eosinophile cells in Case II show that this independence is also exhibited in the malarial cycle. If the independence exhibited in these two diseases is the normal response of this series of cells, then to record eosinophile counts as a percentage of total leucocytes may be misleading; the absolute counts must be the true index of variation from the normal.

These studies of the behaviour of the eosinophile leucocytes suggest that in malaria and in helminth infestations there are two different reactions, one specific, the other non-specific. The mild eosinophilia of convalescence and the prefebrile fall in the eosinophile cell count in malaria are similar to the changes seen in acute bacterial infection, such as pneumococcal pneumonia. This is possibly a non-specific reaction of this series of cells to febrile illnesses. In contrast with this non-specific reaction is the pronounced eosinophilia of the helminth infestations. This is dependent on the presence of the parasite in the host, and indicates that the helminths produce a specific agent, which influences the eosinophile cells alone. This agent presumably varies quantitatively in the different species of parasite. The specific response to the parasite is analogous to that of the neutrophile cells to bacterial infections and of the lymphocytes to virus diseases.

Summary.

1. A study of the eosinophile leucocytes has been made in a large number of men who have recently returned from the tropics.

2. The depression of the number of eosinophile leucocytes in a malarial attack and the subsequent eosinophilia after treatment are discussed.

3. The eosinophilia present in helminthic intestinal infestation is analysed.

4. A group of cases of "unexplained" eosinophilia is recorded.

TABLE IV.

Date.	Distribution of Leucocytes per Cubic Millimetre of Blood.						Hæmoglobin Value. (Percentage.)
	Total Leucocytes.	Eosinophile Cells.	Neutrophile Cells.	Lymphocytes.	Monocytes.	Other Types.	
19.6.43	32,000	18,000	7,040	5,440	960	460	
3.7.43	32,700	20,600	6,500	5,400	—	200	
10.7.43	32,500	22,425	6,350	3,580	—	145	85
20.7.43	26,500	16,690	5,560	3,710	265	540	88
3.9.43	28,700	17,500	6,120	4,790	—	290	95
22.9.43	13,700	2,420	7,670	2,600	820	190	
24.9.43	18,100	9,950	3,260	4,000	720	170	
27.9.43	17,500	9,970	4,030	3,320	180	—	

5. It is thought that in malaria and in the helminth infestations studied, two different factors are concerned with the production of eosinophilia: (a) a non-specific factor similar to that present in bacterial infections; (b) a specific factor due to helminth infestation.

Acknowledgements.

I wish to thank the Director-General of Medical Services for permission to publish this paper, and Major H. O. Lancaster, pathologist, and his staff for the hæmatological determinations upon which this commentary is based.

References.

(1) T. E. Lowe and H. O. Lancaster: "Hookworm Infestation", THE MEDICAL JOURNAL OF AUSTRALIA, April 1, 1943, page 289.
(2) R. J. Weingarten: "Tropical Eosinophilia", *The Lancet*, Volume CCXLIV, 1943, page 103.

COMPLEMENT FIXATION TESTS IN MENINGOCOCCAL INFECTIONS.

By J. M. BONNIN,
Major, Australian Army Medical Corps,

With an Appendix by LUCY BRYCE,
Major, Australian Army Medical Corps.

(From an Australian Military Hospital.)

A CLOSE morphological, cultural and serological relationship exists between meningococcus and gonococcus.(1) In 1925 Gordon(2) showed that the Type II meningococcus contained a considerable amount of gonococcal antigen, as well as, and distinct from, meningococcal antigen. It is known that a positive response to the gonococcal complement fixation test may be obtained in cases of meningococcal meningitis.(3) The object of this investigation was to determine whether this test would be of use in the diagnosis of obscure meningococcal infections. Cruickshank(4) has recently shown that a meningococcal complement fixation test is of value in this respect. Later in this investigation a meningococcal complement fixation test was carried out with a polyvalent antigen. Still later a monovalent meningococcus antigen was used.

The results of this investigation follow, and the histories of one case of chronic meningococcal septicæmia and of three suspected cases are detailed.

Results in Meningococcal Infections.

Meningococcal Meningitis.

Twelve cases of meningitis were studied. The gonococcal complement fixation test was repeated after an interval of one week in nine cases (21 tests in all). The response to the test was strongly positive once, positive four times (in four cases), weakly positive nine times (in six cases) and negative seven times (in seven cases).

The meningococcal complement fixation test, either a polyvent or monovalent antigen being used, was carried out in nine cases, in five of which it was repeated after a week (fourteen tests in all). The response was strongly positive five times (in four cases), positive five times (in five cases), weakly positive once and negative three times (in three cases).

In all these cases treatment with sulphonamide drugs was begun within a few days of the onset of illness, so that little time was allowed for the development of antibodies.

Chronic Meningococcal Septicæmia.

The history of the only proved case of chronic meningococcal septicæmia that has been available for study is as follows:

CASE I.—Gunner D.R.W., aged nineteen years, had had no serious illness previously. He awoke on March 5, 1943, shivering, with headache and pain in the left elbow. The shivering continued for several hours till he was admitted to a camp hospital; his temperature on admission was 104° F. No other abnormal physical signs were found. From then on he suffered several short-lived bouts of headache and fever at irregular intervals of one to three days. On the eighth day petechial spots were first noticed on the forearms and ankles, and the soldier complained of a painful tender area over the left shin just above the ankle. He was transferred to this hospital on March 13.

Examination revealed a well-nourished, apyrexial youth with a readily palpable spleen and a rash. The latter consisted of twelve erythematous macules evenly distributed on the trunk and varying in size from three millimetres to one centimetre in diameter, and about fifty lesions of various types on the extremities. The largest was on the left shin just above the malleolus; it was between three and four centimetres in diameter and was indistinguishable from the lesions seen in *erythema nodosum*. Numerous similar but smaller lesions were present, some of which had a purpuric spot in the centre. There were also a few purple purpuric spots not surrounded by erythema. The patient was regarded as suffering from meningococcal septicæmia and was kept in bed for observation. On the eleventh day of the disease headache and pyrexia again developed. Within half an hour of the onset of pyrexia blood was taken for complement fixation tests, white corpuscle count and bacteriological examination. The white corpuscles numbered 16,000 per cubic millimetre. The responses to both the meningococcal complement fixation test and gonococcal complement fixation test were negative. From the blood a Gram-negative diplococcus was isolated. Bacteria were found first on the fifth day of culture, but had to be repeatedly subcultured before satisfactory sugar tests and agglutination tests could be undertaken. The organisms obtained gave the cultural reactions of the meningococcus, but failed to agglutinate with groups I, II or IV anti-meningococcal serum.

The patient again became pyrexial on the twelfth day, but attempted blood culture on this occasion was without result. On the fifteenth day he was again pyrexial and a few new petechiæ developed. Throughout the foregoing period crops of macules and papules developed, the macules in particular being transient. The spleen remained palpable. On the sixteenth day he awoke with meningitis. The cerebro-spinal fluid contained 3,000 cells per cubic millimetre and 300 milligrammes of protein per 100 cubic centimetres, and from it the same organism as had previously been grown from the blood was obtained by culture. Attempted culture from the blood on this day again gave a negative result. Unfortunately the onset of meningitis occurred before the positive result of the original blood culture was obtained. He was treated with sulphapyridine and responded well. Blood taken on the twentieth, twenty-sixth and forty-first days yielded a strongly positive reaction to the meningococcal complement fixation test. Blood taken on the twenty-sixth day yielded a positive reaction to the gonococcal complement fixation test. This test was not performed on the twentieth and forty-first days. A few days after sulphapyridine therapy was instituted the spleen was no longer palpable and the rash disappeared. He was discharged to duty after a convalescence period of one month.

Results in Controls.

Control tests were performed with the serum of 58 subjects, all of whom denied having suffered from gonorrhœa in the past. Of these specimens of serum, 43 gave negative results with both the gonococcal complement fixation test and the meningococcal complement fixation test. These patients were suffering from the following conditions:

Hæmolytic streptococcal throats	10
Lobar pneumonia	3
Atypical pneumonia	1
Upper respiratory tract infection	1
Rheumatic fever	3
Brucelliasis	1
Pneumococcal meningitis	2
Pulmonary tuberculosis	3
Tuberculous arthritis	1
Acute nephritis	1
Chronic nephritis with furunculosis	1
Chronic bronchitis	2
Infectious mononucleosis	1
Rheumatoid arthritis	3
Subacute non-specific polyarthritis	2
Streptococcal infection of wounds	3
Malaria	3
Gout	1
Functional dyspepsia	1

TABLE I.

Disease.	Duration in Days.	Gonococcal Complement Fixation Test.	Meningococcal Complement Fixation Test.	
			Polyvalent.	Monovalent (Warm Method).
Streptococcal throat	7	− − − − − −	+ − − − − −	Not performed.
Streptococcal throat	4	+ ± − + − −	+ + − + ± −	Not performed.
Test repeated	12	− − − − − −	± − − ± − −	Not performed.
Streptococcal throat	7	− − − − − −	+ − − + − −	Not performed.
Vincent's angina	5	− − − − − −	+ − − + − −	+ + ±
Rheumatic fever	28	Not performed.	+ + + + + +	Not performed.
Test repeated	42	− − − − − −	± − − + − −	Not performed.
Rheumatic fever	2	± − − + − −	+ + ± + + +	Not performed.
Pneumonia	31	− − − − − −	± − − ± − −	+ + ±
Pneumonia	13	− − − − − −	+ ± − + ± −	± − −
Pneumonia	7	± − − ± − −	± − − + − −	− − −
Pneumonia	3	− − − − − −	+ ± − + − −	Not performed.
Chronic sinusitis and bronchitis	180	± − − + − −	+ + + + + +	+ + +
Pulmonary tuberculosis	60	− − − − − −	± − − + − −	Not performed.
Subacute polyarthritis	25	− − − − − −	Not performed.	Not performed.
Test repeated	60	± − − + + ±	Not performed.	Not performed.
Test repeated (after sulphanilamide)	116	− − − − − −	− − − − − −	Not performed.
Test repeated	137	− − − − − −	− − − − − −	Not performed.
Subacute polyarthritis	104	− − − − − −	+ + − + + −	Not performed.
Anaerobic streptococcal empyema (draining)	43	+ − − + − −	+ + ± + + ±	Not performed.
Test repeated	57	+ − − + − −	+ ± − + ± −	Not performed.
Test repeated (wound healed)	90	+ + ± + + ±	+ + + + + +	Not performed.
Test repeated (soldier on duty)	206	− − − − − −	± − − ± − −	Not performed.

The results in the remaining fifteen cases are detailed in Table I.

From Table I it is seen that in fifteen control cases the gonococcal complement fixation test was performed 22 times, that it never produced a strongly positive response, and that the response was positive twice (in two cases) and doubtfully positive five times (in four cases). The meningococcal complement fixation test with polyvalent serum was performed 21 times in 13 cases; it produced a strongly positive response three times (in three cases), a positive response five times (in four cases) and a doubtfully positive response seven times (in seven cases). The meningococcal complement fixation test with monovalent serum was performed four times in four cases (selected); the response was strongly positive once, positive twice and negative once. These results are summarized in Table II.

TABLE II.

Summary of Results of Control Tests.

Test.	Number of Cases.	Result.		
		Strong Positive.	Positive.	Doubtful Positive.
Gonococcal complement fixation test	57	0	2	4
Meningococcal complement fixation test (polyvalent)	56	3	4	7
Meningococcal complement fixation test (monovalent)	4	1	2	0

Results in Suspected Cases.

CASE II.—Private R.T.C., aged twenty-one years, was admitted to hospital on March 2, 1943. He had always been healthy till three days before, when he suddenly began to shiver, and developed generalized aching and sweating. As he undressed he noticed one red spot on the right ankle. The following day he suffered from headache and shivered intermittently all day, and the muscular pains became worse. On the third day he noticed about twenty spots varying in size from that of a sixpence to that of a penny situated on the distal parts of all extremities. He was admitted to this hospital with a diagnosis of *erythema nodosum*. On his arrival here, he complained of tenderness of both shins, and of pain in the right knee and left elbow. The temperature was 102·4° F. The distal parts of both shins were tender on palpation, and movements of the right knee and left elbow were painful. A blush was present over the outer side of the left elbow. On the extremities were found between 20 and 30 discrete, round, reddish papules, varying in diameter from one to four centimetres. Two lesions, on the left shin and the right ankle respectively, resembled

the lesions seen in *erythema nodosum*. The spleen was not palpable. The patient remained pyrexial for three days after his admission to hospital, after which his condition improved, the rash becoming purplish-red and ultimately fading.

Investigation showed that the white corpuscles numbered 9,000 per cubic millimetre. X-ray examination of the chest revealed no abnormality, and the Mantoux tuberculin test produced no reaction. The Wassermann test failed to produce a reaction. An attempt at blood culture produced no growth of organisms; but it was not made till the fourteenth day of the disease, and by that time he was convalescent.

The results of the complement fixation tests were as shown in Table III:

TABLE III.

Day of Disease.	Test.	
	Gonococcal Complement Fixation Test.	Meningococcal Complement Fixation Test.
5th ..	− − −	+ − −
	± − −	+ − −
12th ..	+ − −	+ + +
	+ − −	+ + +
19th ..	+ + +	+ + +
	+ + +	+ + +
33rd ..	− − −	+ ± −
	− − −	+ ± −

No specific therapy was administered, as recovery was uneventful.

CASE III.—Private T.C., aged twenty years, was admitted to hospital on November 1, 1942, complaining of a severe constant pain in the region of the pubis present for the previous eight hours. Examination revealed him to be an apyrexial young man with no clinical abnormality. The pain subsided completely in two days, and he was considered fit for discharge from hospital. On the fourth day of the disease he complained of pain in the left shoulder, which persisted for twelve hours; but no local cause was demonstrable. The following day he complained of pain in the right knee joint, which was found to contain an effusion. That evening his temperature rose to 99° F., the only time it was found to be above normal during his stay in hospital. Blood taken on the sixth day of disease yielded a positive result to the gonococcal complement fixation test ("+ ± −" by the "warm" method, "+ + +" by the "ice-box" method). He denied having suffered from venereal disease. Examination revealed no urethral discharge, while inspection of a prostatic smear disclosed an occasional pus cell with a few Gram-positive cocci. No organisms resembling gonococci were seen. As no further rise in temperature occurred, no blood was taken for bacteriological examination. The synovial effusion subsided, and no further symptoms developed. On the thirty-eighth day the gonococcal complement fixation test produced a very weak positive result, and by the forty-sixth day it produced a negative result. No treatment had been given other than the exhibition of aspirin. He was discharged from hospital, fit for duty, on December 21.

CASE IV.—Gunner T.A.H., aged twenty years, was admitted to hospital on January 12, 1943. He had previously led a healthy, athletic life. Three months prior to his admission he had had an illness lasting for two days, of sudden onset accompanied by shivering, headache, aching in the back and limbs and a rise of temperature to 103° F., followed by vomiting and sweating. Since that time he had had seven further similar attacks at irregular intervals and had on numerous occasions been admitted to camp hospitals, where no definite diagnosis was made. On admission to this hospital he felt well, the last attack having occurred ten days previously. On examination, he looked healthy, and no physical abnormality was discovered.

Investigations revealed that the white corpuscles numbered 10,000 per cubic millimetre; a differential count revealed no abnormality. The serum failed to agglutinate *Brucella abortus* or any of the enteric group of bacteria. Blood taken five days after his admission to hospital reacted strongly to the gonococcal complement fixation test. Investigation of the patient's history and bacteriological examination revealed no evidence of gonorrhœa. He remained well and apyrexial. The spleen was not palpable. Blood taken seventeen days after his admission to hospital gave a positive reaction to the gonococcal complement fixation test ("± − −" by the "warm" method, "+ ± −" by the "ice-box" method). The patient remained well while under observation for thirty-six days, and in view of the strongly positive response to the gonococcal complement fixation test becoming negative, he was discharged to duty without specific treatment.

In these cases the original diagnoses were respectively rheumatism, *erythema nodosum* and recurrent pyrexia of unknown origin. Only one patient (Case II) exhibited the rash of meningococcal septicæmia. In all cases a transitory strongly positive response was obtained to the gonococcal complement fixation test, and in view of this they were considered to be possible cases of meningococcal septicæmia.

Discussion.

From the results, it is seen that the meningococcal complement fixation test is the more sensitive of the two tests in meningococcal infections; it produced a more strongly positive reaction in all but one of thirteen proved cases. However, strong positive or positive results were obtained in 13% of the controls, so that the test is useless in diagnosis. The test performed with the use of monovalent antigen—a recently isolated group I or in a few cases a group II organism—was even more open to error than the original test with polyvalent serum.

In control cases, on the other hand, the gonococcal complement fixation test never produced a strongly positive result, and produced a positive result in two cases out of 58. Doubtfully positive results were obtained in four cases, and these will not be discussed further. In gonorrhœa a positive result is most exceptional during the first week of infection, so that by analogy it is reasonable to suppose that in these cases of meningitis the disease was cut short before antibodies in high titre had had time to develop. The high percentage of weak positive results obtained in cases of meningitis suggests that the results would have become positive in these had the patients lived long enough without sulphonamide treatment.

In the only proved case of meningococcal septicæmia the test produced a positive result on the twenty-fifth day, there having been no reaction on the eleventh day. For what one case is worth, it supports the preceding contention. Case II, the only other case which clinically resembled the picture of chronic meningococcal septicæmia described by Stott and Copeman,[4] also supports this contention, the titre rising to produce a strongly positive reaction on the sixteenth day.

In the other two suspected cases a strongly positive and a positive result respectively were obtained; in both the titre fell rapidly with clinical recovery and unaided by chemotherapy.

Fallacies in the use of the gonococcal complement fixation test in diagnosis of gonorrhœa are numerous. The test depends on the presence of circulating antibodies, and these in turn on the individual response to antigen, on the duration of infection, on tissue reaction and on the resulting nature of the lesion. The individual variation in and the uncertainty of the response to antigen early in the disease are well established. At the height of the disease the test does not always produce a positive result. Late in the disease 3% of patients harbour the gonococcus, though the response to the test has become negative (Price).[5] False positive results may occur by cross-fixation. Thus the test is open to a considerable degree of error when used in the diagnosis of gonorrhœa. It is reasonable to suppose that similar limitations will apply to the test when it is used for the diagnosis of meningococcal infections. In addition, the possibility of the presence of a hidden focus harbouring the gonococcus must be considered. In the control series and in the cases here reported, this was excluded as far as possible by the histories of all patients and by the examination of prostatic smears from patients who yielded positive results to the tests. Cross-fixation with antibodies of *Micrococcus catarrhalis* is known to occur (Oliver[6]) and is another source of error. In the last control in Table I it was thought that this cross-fixation might have been responsible for the positive result, for though this organism was not recovered, no special attempt was made to recover it.

The only other explanation is that antibodies of the strain of anaerobic streptococcus responsible for the empyema caused cross-fixation, because the positive response to the test came and went with the empyema. In sixteen control cases in which disease due to hæmolytic streptococcal infection was present, no positive result to the test was obtained. From this limited series it would appear that cross-fixation with streptococcus antibodies does not occur commonly, if at all.

In chronic meningococcal septicæmia, bacteriological examination of the blood frequently produces negative results.[5] In typical cases a clinical diagnosis may readily be made and confirmed by response to the administration of sulphonamides. In cases in which no rash is present, the diagnosis is difficult, and many such cases are probably missed. It is in these cases that the gonococcal complement fixation test may be of value. It obviously cannot be used as the sole criterion for diagnosis, because of the many fallacies to which the test is liable; but it can at least be used as an indication for sulphonamide therapy. Paradoxically enough, it appears to be more reliable than the meningococcal complement fixation test, and is certainly more readily available. If its limitations are realized, and if the result is interpreted in the light of the clinical picture, it may prove a valuable aid to diagnosis and may possibly anticipate the onset of meningitis.

Summary and Conclusions.

1. The gonococcal complement fixation test was found to produce a positive result in some cases of meningococcal infection. It also produced a positive response in two of 57 control cases. Thus it should not be regarded as absolute evidence of gonococcal infection.

2. The meningococcal complement fixation test performed with two varieties of antigen was found to be too open to false positive results to be of any diagnostic value.

3. The gonococcal complement fixation test may be used as an aid to diagnosis in obscure cases of meningococcal septicæmia. The result should be interpreted in association with the clinical picture. The limitations of the test have been discussed.

4. The gonococcal complement fixation test may show that chronic meningococcal septicæmia presenting in other than the well-recognized form is more common than is generally realized. Though it cannot be used as the sole diagnostic criterion, it may be used as an indication for chemotherapy.

Acknowledgements.

The Commonwealth Serum Laboratories supplied the meningococcal antigen, and Dr. H. McLorinan supplied the serum from several cases of meningitis. The Director-General of Medical Services, Major-General S. R. Burston, has given permission to publish this article.

References.

(1) E. G. D. Murray: "Meningococcus Infections of the Male Urogenital Tract and the Liability to Confusion with Gonococcus Infection", *Urologic and Cutaneous Review*, Volume XLIII, November, 1939, page 739.
(2) H. M. Gordon: "Studies of the Viruses of Vaccinia and Variola", Medical Research Council of the Privy Council, Special Report Series Number 98, 1925, page 105.
(3) W. W. C. Topley and G. S. Wilson: "Principles of Bacteriology and Immunity", Volume II, 1929, page 942.
(4) R. Cruickshank: "The Complement Fixation Test in the Diagnosis of Meningococcal Meningitis", *The Journal of Pathology and Bacteriology*, Volume LII, January, 1941, page 142.
(5) A. E. Stott and W. S. C. Copeman: "Chronic Meningococcal Septicæmia", *The Lancet*, Volume CCXXXVIII, June 22, 1940, page 116.
(6) I. N. O. Price: "The Complement Fixation Test for Gonorrhœa", 1933.
(7) J. O. Oliver: "Complement Fixation Test in Relation to Gonococcus and Allied Organisms", *The Journal of Hygiene*, Volume XXIX, December, 1929, page 259.

Appendix.

The technique used in the performance of the gonococcal and meningococcal complement fixation tests recorded earlier was as follows.

The serum to be tested was diluted one in five in normal saline solution and inactivated at 55° C. for half an hour. The complement used was fresh guinea-pig serum, titrated for hæmolytic activity on the day of the test. The hæmolytic system consisted of a 3% suspension of sheep's red cells sensitized with three minimum hæmolysing doses of hæmolysin (the serum of rabbits previously immunized to sheep's cells, the hæmolytic titre of which is determined at the time of preparation of the serum).

The antigens used were as follows. The gonococcal antigen was standardized polyvalent antigen as supplied by the Commonwealth Serum Laboratories. The meningococcal antigen was specially prepared at the Commonwealth Serum Laboratories for this survey, and for the following description of this antigen we are indebted to Dr. F. T. Wheatland:

> The meningococcal antigen for the complement fixation test was prepared from 17 strains of *N. meningitidis*. These included 2 Group I American strains (1027 and 331), 2 Group II American strains (963 and 933), 1 Group IV American strain (158), 6 locally isolated Group I strains and 6 locally isolated Group II strains.
>
> The strains were grown on serum agar for 48 hours and then washed off in physiological saline solution and killed by heating to 65° C. for half an hour. The resulting suspension was centrifuged and washed in physiological saline solution 5 times. It was tested in various strengths for anti-complementary properties and then made up to contain 2,000 million organisms per ml., at which strength it was not anti-complementary.

The technique of the test is as follows. Two methods, the "warm" and the "ice-box" method, are used for each specimen of serum. In each method four tubes are used; to each tube is added one volume (two drops of 0·05 cubic centimetre each) of diluted serum. To tubes 1, 2, 3 and 4 are added 1·0, 1·5, 2·0 and 1·0 volumes respectively of a dilution of complement equivalent to three minimum hæmolytic doses in the "warm" method and four minimum hæmolytic doses in the "ice-box" method. To tubes 1, 2 and 3, one volume of antigen is added. The volumes in all tubes are equalized by the addition of appropriate amounts of normal saline solution, so that the tubes finally contain four volumes (eight drops). The fourth tube is the serum control, since it contains no antigen. Known "positive" and "negative" sera from previous tests are included in each batch. Antigen controls, in which one volume of antigen is mixed with the various amounts of complement used, are also set up.

In the "warm" method the racks are placed in a water bath at 37° C. for one hour. In the "ice-box" method, the racks are refrigerated overnight. After these intervals, one volume of sensitized red cells is added to each tube, and the racks are placed in the water bath at 37° C. Readings are taken as soon as sera and antigen control tubes show complete hæmolysis.

Reading of Results.

Complete hæmolysis in any one tube is recorded as "–"; complete inhibition of hæmolysis in any one tube is recorded as "+"; partial inhibition of hæmolysis in any one tube is recorded as "±". Specimens of serum which fix six or more minimum hæmolytic doses in the "warm" method, or eight or more in the "ice-box" method, therefore give readings of "p+++", while the reaction of those fixing three or four minimum hæmolytic doses respectively would be recorded as "p+−−", with readings such as "p+±−" for intermediate degrees of fixation. These readings are interpretated as follows (Table IV):

TABLE IV.

"Warm" Method.	"Ice-box" Method.	Interpretation.
"p+++"	"p+++"	Strong positive.
"p++±" to "p±−−"	"p+++" to "p+±−"	Positive.
"p−−−"	"p+−−" or more	Weak or doubtful positive.
"p−−−"	"p±−−" or "p−−−"	Negative.

As a rule, the "warm" method is less sensitive than the "ice-box" method. Readings such as "p+−−" ("warm" method) and "p++−" ("ice-box") are therefore often obtained. Occasionally, however, slightly stronger fixation is observed by the "warm" method when readings are taken immediately the controls are hæmolysed. Such fixation, however, is often transient, and hæmolysis proceeds rapidly, very often being complete after an half hour or so, whereas in cases in which some degree of fixation by the "warm"

method is confirmed by stronger or equivalent fixation by the "ice-box" method, there is usually inhibition of hæmolysis for some hours at least. Such transient inhibition of hæmolysis is difficult to interpret and probably does not represent true specific fixation. It has arbitrarily been recorded as "negative" if it was present in the first tube only; but if it was present in more than one tube, and accompanied by weaker fixation by the "ice-box" method, it has been recorded and an attempt has been made to evaluate its significance in relation to the clinical findings.

THE FEE PRINCIPLE AND MEDICAL ORGANIZATION.

By ARTHUR E. BROWN,
Colac, Victoria.

PART I.

OUT of the welter of conflicting views and theories that flood the journals these days, there appears to stand out one definite fact. A majority, probably a large majority, of the organized medical profession both in Australia and in the Mother Country has expressed repeatedly and with emphasis its dislike and distrust of a national salaried medical service.

No meeting ever has any difficulty in carrying, almost with acclamation, the inevitable preliminary motion that "a national salaried medical service is not in the best interests of the public". While I can understand the attitude of mind which produces that motion, I regret it, and cannot help feeling that it is unworthy of our profession. It appears to me to be founded largely on prejudice and thoughtlessness, and in that respect to bear an unpleasantly close resemblance to the attitude of mind of the man we all know who is prepared to let his wife or child suffer disability, or even danger, because he "does not believe in operations". Both reactions are similar, expressing a fear of the terrifying unknown. One regards all surgical operations as hostile forces; the other—the attitude of the medical profession—presupposes that all conceivable forms of national salaried service have the same objections, and that no conceivable form could have elements that made it, on balance, beneficial to the public, which, in the light of world experience, is absurd.

You have only to look at the services conducted by the county councils of Middlesex and London in England, whose large hospitals have been raised from the deplorable infirmary status which they occupied in my student days, to a prestige rivalling that of the great historic voluntary hospitals. One of them has been accorded the status of London's chief post-graduate school. I have in my possession a letter from a student, who says he received in one of them better teaching than he had had anywhere in London, and comments on the keenness of the staff.

There seems to me to be a decided touch of arrogance in assuming that to change our system to that already existing in some other countries must be entirely retrograde. I cannot believe that our system, altogether traditional in its origin, is incapable of improvement. It is quite possible that serious-minded men, after a careful study of the whole subject, might still consider that on balance the present system has more to offer the public than has any form of salaried service which has any likelihood of becoming reality. But that attitude seems to me to disregard the fact that the type of salaried service which will become reality here depends in the long run on the medical profession itself. In its persistent tardiness to remedy the faulty elements in our present system, the profession is not, in my opinion, doing what is necessary to achieve a service which it would itself regard as the best.

The whole matter readily divides itself into two main parts. One is the manner of payment for the services rendered, and the other is the quality and availability of those services. It is hardly to be wondered at that on the political side attention has been directed mainly to the matter of payment, and chiefly, of course, in the sense of relieving the public from the burden of medical expenses. But it is very much to be wondered at that the medical profession itself, comprising as it does those men to whom governments turn for advice as medical experts, should have so preoccupied itself with the same side of the problem. From our point of view it is of very minor importance. If the payment is to be by fee, it matters little whether the fee is eventually paid by the patients or by the Government, by tax, by "pool" or by insurance fund. This affirmation of unimportance will, I know, be vigorously attacked; but, compared with the greater question of reorganization and improvement of the services, the manner of payment is, or should be to us as professional men, of very little concern indeed.

The only great point in the matter of payment—great because on it hangs the whole possibility of reorganization and real improvement—is the question of payment by salary instead of by fee; yet from that aspect the profession has resolutely averted its eyes. The word "salary" has conjured up all actual and possible faults of a civil service, and the assumption has followed that these faults must inevitably accompany the introduction of salary as the accepted method of payment of doctors. Should this happen, the fault will lie with the medical profession for its refusal to make a conscientious study of the fee principle as opposed to the salary principle in its relation to the possibilities of organizing effective medical services.

So long as doctors are paid by fees, in whatever form and from whatever fund they are derived, so long will individual doctors, associated groups of doctors and the medical profession collectively, maintain a vested financial interest which is at many points at variance with the public good. It has been my experience that whenever medical vested interest is mentioned, some honest man will protest that this is an insult to the profession. It is not. The term does not refer to any tendency on our part to maintain the incidence of sickness, nor to lessen the speed and cheapness of curing it. Such a charge is denied in every chapter and every page of our profession's history, and every day in the contemporary lives of its members. The denial is so apparent and so obvious that none but a lunatic could hope to maintain the charge; and in fact the charge is very seldom made seriously. There is no fear of our being misunderstood in that direction. Our vested interest consists in the payments of our patients and in the income-producing value of the aggregate of the patients whom any doctor, or any group of doctors, serves. It represents, in fact, exactly what we mean when we refer to our "goodwill", for which we pay when we purchase a practice, and for which we expect, and rightly expect, to be compensated should sudden comprehensive government action take it from us. The value of our interest depends on the number of patients who can be attracted to seek the services of any particular doctor, and for every such doctor there must exist therefore a struggle to maintain and increase this mass asset value. The struggle, which can be described as my father once described it to me many years ago, as "competition tempered by decent behaviour", will and must remain, whether the fees derived from it are paid by the patients or on their behalf by capitation fees or from a tax pool. The competition will always be there. It is not so certain that under further stress the decent behaviour will always be as evident.

The point is, is that struggle a good or a bad thing? Does it help medicine or hinder it? I think I can agree with the majority that it acts as a stimulus to endeavour. But that it is the only, or the greatest, or the best sort of stimulus, I entirely deny. It is certainly not essential to the highest form of endeavour in any walk of life, and particularly is it not essential to medical and scientific work. The desire to do good work in the sight of one's peers, and the sense of personal responsibility to one's patients, are far greater, and less likely to lead good minds astray. This is freely admitted even now in respect to university professors, medical officers of health, hospital superintendents and resident medical officers, staffs of

clinics, radiologists and pathologists. It would seem strange if it could not be equally true of general practitioners and specialists outside of hospitals and clinics. On the other hand, a little study makes it evident that the competition, the struggle to maintain one's asset, which is dependent on the fee principle of payment for medical services, is the greatest single bar to progress in medical organization at present existent.

PART II.

My thesis is that the fee principle is inimical to the best interests of medicine, and therefore of the public, in at least the following respects:

1. It tends to develop in some men a commercial rather than a professional outlook.

2. It makes the members of the profession unduly sensitive to new extensions of public health measures and auxiliary medical services, and biases their judgement in considering them.

3. It prevents the proper distribution of medical services and medical men.

4. The property value of patients is a bar to full cooperation between doctors.

5. It prevents that supervision of junior men by senior, which is essential to the wide and uniform raising of medical standards.

6. It creates a division between fee-paid private practice and salary-paid public health work, to the detriment of the latter.

Let me elaborate these charges in more detail.

It tends to develop in some men a commercial rather than a professional outlook.

I do not want to lay undue emphasis on this aspect; but it is necessary to point out again that there is a reverse side to the argument as to the value of the financial stimulus in keeping men keen. And I do not want to dwell on those unhappy men who have turned entirely to the commercial outlook and whose professional and scientific interests, so actively fostered during their student days, have atrophied before their greed for material success. There are some in our midst—enough to tarnish our good name in the public eye, though not nearly so many as the public thinks.

But consider what happens to the ordinary young man who emerges fresh from his hospital, where during six or more strenuous years the earning of money has hardly been mentioned, and where good work and the approbation of his professional superiors have been his primary goals. He steps out into the world of competition, and usually the force and effect of this competition are most painfully emphasized to him by the debt he has contracted to purchase his practice. The struggle for assets encroaches immediately on his field of vision, and as his responsibilities grow, it must come to occupy an increasing proportion of that field. Certainly it drives him to work; certainly it makes him attentive to his patients, driven by the fear that they may leave him if he is not. But that fear is not altogether a laudable thing. In no profession is it more true that you cannot serve God and Mammon, and it is not given to all of us all the time to keep our ideals at full polish. A divided mind as to the goal is the cause of the depressing number of middle-aged doctors who, although they started with the highest ideals, end with only a satisfactory bank balance and thickened coronary arteries. Each man keeps his struggle to himself. We shut off our financial worries from our colleagues, bravely pretending that there is no struggle. And with it we shut off, too, that knowledge of our professional worries and failures which would be so much better shared to our mutual advantage, because they might reveal that the struggle is still with us, and that we are no more immune than they. There is enough to struggle against in our professional life—our daily problems and our lack of knowledge in dealing with them—without our being shackled by financial nervousness, which makes us deny ourselves the help of others for fear it may lessen our prestige or lower those precious assets.

It makes the members of the profession unduly sensitive to new extensions of public health measures and auxiliary medical services, and biases their judgement in considering them.

Once the fact is accepted that a doctor's practice is an asset which he must struggle to maintain and increase, this follows so logically that it would almost seem to be a self-evident proposition. When the doctor's income depends upon and is proportionate to the number of patients who seek his help, it is obvious that every new departure in the way of public health services, tuberculosis dispensaries and so on is a menace, potential or actual, to his security; and there are very few of us so immune to financial threat that we have no reaction to it.

This is not a theoretical statement. Historically, the fear reaction has been shown to occur readily in the normal way, and to induce that excessive caution in the official bodies of our profession which leaves them open to the charge of ultra-conservatism. I have heard both Bush Nursing centres and baby health clinics most bitterly criticized—not recently, but years ago in the early days of their developmental course, when the actuality of the menace they presented had not yet taken full shape. Nowadays, since it has been shown that that menace is small, and that the benefits of both movements are great, there is no general opposition. What opposition exists lies only in the minds of a few practitioners who have not managed to adjust themselves to the situation.

Also, years ago, when the community hospital principle was trying with some difficulty to rise above the horizon, I heard it severely criticized, and often on the open ground that the establishment of one in a country district might have an adverse effect on the practices of the men in surrounding villages. In a State committee formed for the purpose of working out a hospital policy for our Association, it took me sessions of hard going before I was able to have inserted a clause to the effect that "in small centres in the country" the principle of the community hospital might be tried experimentally. After one session's absence, I found my clause deleted, and another session of intense arguing was needed to have it readmitted. Finally, by the way, our policy was submitted to a Branch meeting, and the whole thing was rejected out of hand. Meantime, of course, community hospitals were being quietly erected in one place after another. I wonder how many of those who argued so strongly against their introduction remember now even that they did so.

I have heard an hour's discussion by one of our official bodies devoted to the staffing of a suburban ante-natal clinic. The point of the argument was how far distant from the clinic should a doctor reside before his offer to serve on it in an honorary capacity could be considered safe from the danger of affecting, by the introduction he would thereby receive, the practices of the doctors in the more immediate vicinity. At another official meeting of one of the bodies of our Association, called specially for the purpose of giving consideration to the Sixth Interim Report of the Parliamentary Joint Committee on Social Security, when the recommendation advocating centralized cancer treatment was discussed, approval of it was formally denied, on the ground that it might deprive the private practitioner of his right to treat cancer patients. It does not need a very keen prophetic eye to foretell the fate of other recommendations more closely impinging on the rights of private practitioners.

A critic of our profession would say these oppositions, these hesitations, were due to greed or selfishness. No one who knows the atmosphere in which the discussions were held would subscribe to that for a moment. They are due solely to the self-defensive reaction brought into being by a seeming threat to that asset value of practice on which the security of all doctors depends. This is abundantly proved by the fact that once the reform has been instituted, its value recognized and its menace brought into proper proportion to its results, the medical profession has in every case accepted it, and by loyal cooperation made it work as part of the system of medicine in force.

Even in Queensland, where the proposed alteration of the honorary status of specialists in hospitals caused such an outcry beforehand, now that that alteration has been accomplished, work goes on quietly without difficulty, and numerous professional men are now constructively criticizing the system for its improvement, although in this case evident possibilities for further conflict still exist.

So long as fees in any form—capitation, fee for service or what you will—continue to determine the size of a doctor's asset by the number of patients who attend him, so long must this defensive conservatism remain an integral and natural part of the medical profession's reaction to projected reform. Unbiased constructive thinking on medical reorganization is not logically possible to the profession in the presence of a fee system of payment.

It prevents the proper distribution of medical services and medical men.

This is apparent in industrial suburbs, in which it is necessary for a doctor to build up a large aggregate of patients—larger, often, than he can properly deal with—in order to secure an asset great enough to compensate him for the less attractive surroundings and more arduous work involved. The same may be said of those areas of our States known as "remote".

In this place I want to stress another aspect, less often regarded—that of regionalization. It may best be illustrated by example. In the State of Western Australia there exist within a short distance of each other, three small townships, whose names I may perhaps be permitted to withhold. In each there are a doctor and a small hospital, the daily averages of occupied beds in the three hospitals being 13, 22 and 12 respectively. Intermediate between these there is another village, now developing into a relatively important dairying centre, and served at present only by a bush nurse. Two of the three small hospitals are deplorable in design, construction and maintenance, and obviously unsuited for their purpose. It is at once evident to any observer that correct organization here would be to discard the three little hospitals and serve the whole district from a new central hospital at the dairying site, at which the three doctors should be concentrated, the three townships at present occupied being served as outposts from this centre. The hospital could certainly be built; but what organization exists to concentrate the doctors? Staff the new hospital with new doctors and you do grave harm to the three men round it and overstaff the district. Yet, how could one expect the three men to abandon the practices they have purchased, and leave them open to the risk that someone else will see an opportunity of obtaining an established practice, and entering into competition with them? It appears self-evident to me that three doctors working together in a larger hospital will do better work and serve their public better than three doctors working in isolation in three separated centres. I know that there are some who will contest this point—who still believe that the village doctor in his isolation is an efficient unit in our medical system. I refuse to chase that red herring. For the purposes of my thesis it does not matter if he is or not. The point is sufficient, that even were it universally acknowledged that the change would be a beneficial one, it could not be brought about under our fee system without grave injustice to the men concerned.

A similar position exists in the neighbouring State of South Australia. In the district to which I refer, all the doctors interviewed agreed that a central hospital would better serve the district concerned; and to point the moral, at the site they mentioned as the correct one, a high school has already been erected to take care of the district's educational needs.

Regionalization is making its painful way into general consciousness as one of the vital needs of medical reorganization. Consent to its application to any place cannot reasonably be expected from the doctors who will be immediately affected by it while the process offers to their security the menace it does at present.

The "property value" of patients is a bar to full cooperation between doctors.

Here is another statement which I know will be hotly argued. It will be said, and with justice, that the experience of this war has shown how well doctors can and do cooperate—that our practices protection schemes are a lasting honour to us; so they are. The "decent behaviour" which tempers the competition has been very much in evidence in face of the loss which with certainty confronted many of our members on their enlistment. But let me illustrate my point with another example, quite an honourable one, too. In a certain district in a certain State, there is a doctor whom for the sake of clarity we shall call Dr. X. He practises in a village some dozen miles from a fair-sized town, which latter is equipped with an efficient district hospital. Some 50 to 100 miles away is another township served normally by two men, one of whom went on active service and the other suddenly died. The man on service found difficulty in obtaining an immediate release, and Dr. X felt that he should and could go across and hold the practice until such time as the release was granted. He asked the men in the larger town if they would look after his practice in his absence, and their first reaction was of entire willingness. However, a little reflection brought a difficulty to light—Dr. X's practice was held together by his personality and work. If, in his absence, his patients contracted the habit of travelling to the town for medical care, they might well be impressed by the extra facilities provided by the hospital and many might well be expected to continue to travel to town after Dr. X's return. It would not be possible to safeguard his practice, and the step in cooperation might well bring a decided threat to his security. When this aspect was put to him, he reluctantly agreed that it would not do for him to go. Again, I do not want to stress the details in this particular case, but only to show a way in which the full cooperation between doctors is hindered by the presence of the patient's asset value. It is, in fact, constantly seen.

I can quote another instance in which a doctor in a country village prefers to take or send his patients to the metropolis, a hundred miles distant, rather than use the facilities of a neighbouring district hospital a bare ten miles away. His reason is the same—the apparent threat to his assets from the competition of the larger town.

I know from personal experience, and from observations over a wide field, that in those States which have organized their districts on a base hospital scheme, the scheme does not function as it should. The villages do not drain into the district hospitals, and the district hospitals do not drain into the base hospitals. It appears to be a risky procedure to send patients away to a neighbouring and possibly competing centre. There is a danger of loss of assets. When patients need to be sent away for help, they are sent to the metropolis, to seek the assistance of Macquarie Street, Collins Street or Wickham Terrace, which is not in the same sense competitive. The idea of the base hospitals, to build up a specialist staff and save the congestion of the metropolitan hospitals, has not materialized. The clinical material does not flow to the base towns to enable the specialist staffs to be built up; it is not likely that it will while the struggle for assets continues.

It prevents that supervision of junior men by senior, which is essential to the wide and uniform raising of medical standards.

No one is likely to deny that it is in accord with the public interest that the highest standard of medical service attainable in any community should be widely and evenly spread throughout that community. I will gladly bear witness that the general standard of medical service in this country is a high one, and stands comparison well with that in such other countries as I have been fortunate enough to visit. But that standard is not a level average. It has peaks and valleys. It is rare to find a suburban or country centre working on the same level of efficiency as the great metropolitan hospitals. And—I say it deliberately, having seen it—there are some centres in

which the standard is far from high. Should the raising of the general standard to that (or approximately to that) obtaining in the metropolitan areas be possible, it is an obvious objective for medical planning to bring it about.

I believe it is possible by means of three procedures: (i) by the fuller use of the opportunities for teaching afforded by the ordinary professional consultation; (ii) by a better planning of post-graduate education; (iii) by control and supervision of the staffs of clinics and hospitals.

1. At the present time the young man emerging from the medical registration board, with his diploma in his hand and his registration certificate in his pocket, is, professionally speaking, a king in his own right, and theoretically the equal of all other qualified medical men. He passes to his professional struggle, where competition is keen, and any denial of that equality is, or appears to be (which means the same thing), damaging to his prestige. Prestige is one of the vital factors in maintaining one's assets, and hence one is very sensitive; and anyone attempting to supervise that man's work has to tread as upon egg-shells. At intervals problems arise which demand the help of consultants, and the matter has to be most delicately handled. The patient in nearly every case receives a full 100% of the value from the consultation. That does not come into question. But the sensibilities of the practitioner, particularly if he is young, must be most carefully shielded, for, after all, the consultant has his own asset struggle to maintain, too. The consultation is the property of the practitioner himself, and rarely do his colleagues share in the benefits obtained from the consultant's review of the case. In many clinics, on the other hand, the staff—being on salary, and not having their sensibilities sharpened by financial considerations—are called together, and the case is reviewed before them. The consultant starts by reviewing the mistakes and omissions which have been made in the examination or treatment, and then passes on to his own opinion and the reasons for his arriving at it. A valuable teaching facility could thus be used which is now neglected. Would that be contrary to the public interest?

2. Post-graduate education has not, in the past, been adequately organized, and has been availed of by a very small proportion of the practising members of the profession. It has been based on the provision of a series, lasting a week or so in the year, of tutorial classes, lectures and demonstrations, which members of the profession are invited to attend. To do so, however, a country practitioner has to leave his practice for a week or more and generally pay the expenses of a *locum tenens*. As he cannot afford to be away from his practice too often or too long, his attendance at these courses frequently means that he must forgo or curtail his annual holidays. It would be interesting to try to learn from the various post-graduate committees just what proportion of country doctors can and do attend these courses in peace time. After attending them a practitioner returns to his own town, where conditions of work are very different and facilities are often very inferior, and he carries in his head what he has learned in a form not easily impartable to his colleagues if any and enters again on the life of competition.

This is not a highly efficient method of raising the general standard. It undoubtedly has had some effect and is worth doing, for it is the best that can be provided at present. A far better method would be to send out post-graduate teaching teams, consisting of, say, a surgeon, a physician, a pathologist, a radiologist or other specialists, and including a good tutor sister, to travel through the countryside, living and working in the country and suburban hospitals, teaching by example in the presence of all the men working in the district visited, noting and commenting on the deficiencies of equipment and facilities, and holding staff conferences on the standard and nature of the work actually being done in the various centres. This, I agree, is not possible under present conditions, but again I would ask, would it really be contrary to the best interests of the public if, by a change from fee to salary, such a system were made easily possible?

3. The third method of raising the general standard of medical service is even less possible under any fee principle, and yet it is probably the most important of all. The medical superintendent of one large hospital in an Australian city, when discussing with me the proposed addition of intermediate and private wards to his hospital, stated that they would take care that only members of the staff of the hospital would have access to those wards. On my expressing surprise at such a departure from the usual policy, he made the following simple but emphatic statement: "We are not going to allow our standards to drop." This was not necessarily an insult to the practitioners not on the hospital staff. It was simply a restatement of the evident fact, world-wide in its application, that where efficient professional control and supervision do exist, the standard of work done rises above the general average of that of independent doctors. In every successful clinic in the world, the principles of salary, supervision and control obtain. Therefore, the aim of raising the general standard involves the means of enlarging and widening the hospital and clinic staffs, until all doctors practising in the area served by the hospital or clinic are members of its staff, sharing its prestige and subject to its supervision.

There are some obvious ways in which that improvement could be effected—ways which come to mind without much searching. The first is in note-taking and record-keeping. Unless we are all wrong—from the late Sir James Mackenzie down to the least of us—there is a vast amount of research material available but unused, wasted by reason of faulty—or more often, absent—records. I am certainly conscious of it in my own immediate environment, and it is the one increase in clerical work which, to my mind, doctors should gladly welcome. You will never get it, nor would you be able to make full use of it if you did get it, without control and supervision.

The proper use of old and new methods of medical treatment and surgical technique, compared and discussed in the light of patients actually under treatment, at staff meetings regularly held is another method of improvement. No capitation fee, no fee for service, no insurance plan will make this possible outside of hospitals and clinics. Nothing will, except the substitution of salary for fee and the recognition of grades of superiority and inferiority of professional experience and judgement.

A third means of improvement lies in the proper use of laboratory and ancillary aids to medicine, at present so grievously backward. Would it be very much against the interests of the public if the superintendent of a district or base hospital were to have the power to go to the doctor in a neighbouring centre and ask him why no blood films had arrived from him for months—was he missing cases of anæmia, or were his patients not suffering from anæmia? Why were none of his people sent for X-ray examination of the chest—had he no tuberculosis contacts that should be tested? It should not be possible for anyone to be told, as I was told a short time ago: "No, we do no blood urea estimations here, but we do a lot of prostatic surgery!" How are you to compel the slack practitioner—and there are some of them—to mend his way and keep his standard high, so long as he is an independent sovereign trader, responsible to no one but himself and, owing to his financial struggle, intensely sensitive to any encroachment on his prestige?

On the other hand, I do not think that any one would seriously deny that the performance of one's daily work constantly in the sight of and under the criticism of one's professional colleagues is a spur to the improvement of that work—greater than is the incentive of an increased income and carrying far fewer dangers.

I may be reminded here that group practice will provide the necessary incentive without the need for control. I reply that even effective group practice itself is not possible under our present fee system. At one of the most famous and successful clinics in Australia, the suggestion was put forth that in this form lies the solution of the problem of medical services. Alone, it does not. The formation of a group of ten or a dozen men for specialized and coordinated working is comparatively easy in any

city; but it does not pretend to cater for the medical needs of a city with a population of several hundred thousand. It would require the extension of the clinic staff to, say, 35 men and the formation of ten such clinics to put the medical services of the city on a clinic basis. Further, if those clinics are to be properly located and not to overlap or become competitive, what is obviously required is a coordinating body, granted powers of control to some degree at least over the various groups. In fact, the logical development of this idea comes perilously close to a local salaried medical service.

The objection also will no doubt be raised that no such control is necessary at all—that if group clinics took the place of individual practitioners by natural growth processes, the standard of work would be thereby automatically elevated. To a certain extent, no doubt, this would be so; but I am quite certain that in a wide sense the results would be disappointing. In one of the Australian cities a group of men discussed the formation of a clinic in their suburb. There were six or seven of them, their ideas were good and they were prepared to put up the money for the material establishment of their clinic. I asked them did their plan embrace all the men working in the suburb, and their answer was, "no". There were some men in the area with whom they would not be associated. Now I am not concerned with the facts in this case—whether, in fact, one group of practitioners was or was not less ethically inclined than the other. What is important is the principle which leaves some 40% or so of the medical strength of the district excluded from the clinic, and presumably some 40% or so of the population debarred from the benefits accruing from the clinic's working. The excluded men must go on working in opposition to the clinic, whose consolidated interest will be pitted against their individual interests. It is evident that they will not cooperate with it. Should the clinic be successful, as it probably will be, the outside men will either have to form an opposition clinic in self-defence (which is obviously wasteful and merely substitutes two competing groups for several competing individuals), or, if they are among the weaker brethren, the economic pressure is likely to force them more deeply into unethical but commercially more profitable procedures, to defend their threatened status. Magnify this single example by many hundreds to serve the hundreds of suburban districts in this country, and he would be a bold and optimistic man who would see in it salvation for medicine.

It creates a division between fee-paid private practice and salary-paid public health work.

This, again, seems to me to be almost a platitude; but some correspondents in THE MEDICAL JOURNAL OF AUSTRALIA, in criticizing some aspects of the report of the Medical Survey Committee, seem to hold the opposite view. I suppose the difference in viewpoint lies in the interpretation of what constitutes a reasonable amount of one's attention to give to public health work. On the face of it, the salaried public health appointment has very little effect on the asset value of the practice. In those States where medical men are retained by local authorities as part-time medical officers of health, the annual salary varies between £10 and £50 to £80. It is not to be wondered at if the men concerned feel that not a great deal is expected of them for that. On the other hand, the maintenance of a valuable practice takes up a great deal of time, in both work and reading. I wonder how many general practitioners have books on public health subjects in their libraries, and what proportion of their reading time is spent on them if they have. That good work in this line is possible is shown by the excellent little book by Pickle, an English country medical practitioner, entitled "Epidemiology in Country Practice". I have no doubt that among the 3,000 or 4,000 general practitioners in this country, there are some who have the bent of mind and the capability to do work as good, but if they do it, it is in spite of the system. Nowhere in Australia have I been able to find any indication that practising doctors regard their opportunities of public health work as being of more than minor importance compared with the claims of their private practices. And this is no matter for marvel.

PART III.

Will a national salaried medical service put all this right? Of course it will not. A national salaried medical service of any sort will bring its own problems, and no one can know what these will be until we face them. A national salaried service is purely an abstraction. What interests us the type of national salaried medical service. It is not necessary to envisage anything like the civil service if we will it otherwise. There is no need to think in terms of things we know; it would be better to think of building in the architecture we believe in. Abandon for a moment the probable and look at the conceivable; suppose that, by decree, tomorrow morning all fees were declared illegal or abolished, and all doctors were paid from that day a salary based on their average net income; suppose that they were not even asked to leave the places or the practices where they had been established. That would be the simplest form of salaried medical service—as I said, conceivable, not probable. It would involve the abolition of the fee principle essentially, and only that. What would be the effect?

Would the doctors slack? Some would, just as some do now. Those whose aim is commercial gain would no doubt react to the taking away of their driving force exactly as one would expect them to. The great majority would do the best work of which they were capable, just as they do now, within the limits of the system.

Would the patients abuse our time and patience? Some would, as do some of the chronic "bad debts" and some few of the million or so lodge patients now benefited under our contract service. The great majority would not, any more than they do now. No evidence indicates that they would.

Would they cease to value our services? How could they? They depend on them for health and happiness, and only too often in life and death situations.

Would the professional relationship be destroyed? Why should it be? We would be still to each of them "the doctor", to whom they will turn, if for no other reason than because they must. In Tasmania, faulty though I consider the system of government medical officers to be, the salaried doctor is still "the doctor", and his relationship to his patients is as close as his personal qualities dictate.

Such a state of things could not, of course, remain static. The questions of control, of promotions and movements, of new entrants to the service, would arise almost immediately; but they would become questions of burning importance to ourselves, to which we would have perforce to bend our highest talents. We would quickly clear our minds of false and biased notions. We might perhaps work out some guild arrangement. One such is mentioned in "Group Practice" by L. J. J. Nye as having been suggested by Dr. Alan Lee. The future would lie open to the full sweep of our imagination in devising means of welding this great service into a force for the betterment of our country, and we would not be hindered in that aim by the fears which at present beset us.

A national salaried medical service, of which the foundations are not laid by the medical profession, may well have many horrors, and the profession is not doing itself or the country a service by refusing to demand its share in the laying of those foundations. It is essential—and I repeat it with emphasis—that the fee principle, with its building up of assets and a vested interest in individual security, should be abandoned if the individual and collective minds of doctors are to be freed to study innovations on their merits, without the sense of fear to warp their judgement, and a principle of salary of some sort must be deliberately adopted.

Once that aim is achieved, the answer to the question of whether the national salaried medical service which results is one that is in the best interests of the public or not will rest in the hands of the members of the medical profession themselves; and I have no doubt that if the question of a national salaried service in principle were settled for them by government pronouncement, and if their brains were freed to plan such a service, they would succeed in producing one which would be very much in the best interests of the public.

Reports of Cases.

MARFAN'S SYNDROME: ARACHNODACTYLY WITH DISLOCATION OF THE CRYSTALLINE LENS. REPORT OF THREE CASES IN ONE FAMILY.

By F. A. LAWES,
Honorary Physician, Hornsby Hospital,
AND
J. C. HALLIDAY,
Honorary Ophthalmic Surgeon, Hornsby Hospital, Hornsby, New South Wales.

IN 1896 Marfan described the case of a girl, aged five years, with malformations of the four extremities. Considerable elongation of the bones and some degree of attenuation were present. There were contractures of the fingers, poor musculature, a spur of the *os calcis* and deficiency of subcutaneous fat. Further, kyphoscoliosis of the dorso-lumbar region of the spine was present, and the child could not walk. Marfan described the fingers and toes as spider-like.

In 1902 Achard reported a somewhat similar condition in a girl, aged eighteen years, and chose the name arachnodactyly. Later, Salle, in 1912, mentioned for the first time ocular symptoms; the pupils were narrow and the anterior chambers shallow, but the disks were normal. For the first time, too, he also mentioned an anomaly of the heart, which autopsy revealed as a patent *foramen ovale.* But it was not until 1914 that Boeger found in two patients iridodonesis and congenital dislocation of the lens. Nobel, in 1919, produced a photograph showing the aged and somewhat melancholy facial expression often described as characteristic. Schlack, in 1926, described neurological symptoms recalling Friedreich's syndrome in a child, aged five years.

In recent years most of the reports have appeared in ophthalmic literature. Weve, in 1930, emphasized the special part played by a fœtal disturbance of the mesodermic structures. For a comprehensive survey of the pathology, causation and literature the reader is referred to an article in *Archives of Ophthalmology,* March, 1942, by Andrew Rados.

Clinical Records.

MRS. N.P., aged fifty-two years, is tall and thin. She had "trouble with her spine" at the age of seven years, and now has a dorsal convex curvature of the upper thoracic portion of the spine. She used to be five feet eleven inches in height and is now five feet nine inches. The sternum is unduly prominent, as are the ribs posteriorly on the right side; the hands and feet are much elongated. Typical arachnodactyly is present in the hands. The measurements are as follows: forefinger, four inches; second finger, five inches; third finger, four and a half inches; fourth finger, three inches. The length of the great toe is three and a half inches and that of the second toe three and a half inches. An X-ray examination of the thoracic part of the spine reveals a destructive lesion (probably healed tuberculosis) at the level of the seventh thoracic vertebra, with some calcification. Spondylitis is present also. X-ray examinations of the hands and feet reveal abnormally long metacarpals, metatarsals and phalanges. The patient's health is now good. Her ocular condition is as follows: she has pronounced iridodonesis and dislocation of the lenses upward, and her visual acuity is $^6/_{36}$ and $^6/_{24}$, and she has never been able to get glasses to improve it.

DOROTHY P., aged fourteen years, is a fairly well-built girl, but she has rather long fingers. When the pupils are dilated iridodonesis can be observed and slight dislocation of both lenses upwards. She has compound myopic astigmatism, but with correction her visual acuity is $^6/_6$.

GEORGE P., aged six years, looks older than his age; his mentality is about average. His face is longer than usual, measuring four and a half inches from nasion to mentum. When stripped, his most notable features are the long fingers and toes and the winged scapulæ. The fingers measure two and seven-eighths, three and three-eighths, three, and two and one-half inches respectively. The toes measure two, one and three-quarters, one and one-half, one and one-half inches and one inch respectively; the length of the sole is seven inches. Physical examination of the various systems revealed no abnormality. His chief complaint was of bad vision. On examination, pronounced iridodonesis and dislocation of both lenses upwards was found.

ANAL ACHALASIA WITH MEGACOLON IN CHILDREN TREATED WITH "PROSTIGMIN" AND ERGOTAMINE TARTRATE.

By J. MCKELL, M.B., B.S.,
Acting Assistant Medical Superintendent, Royal North Shore Hospital of Sydney.

THE cases here reported seem worthy of record because of the relief which the patients obtained from the oral administration of "Prostigmin" and ergotamine tartrate.

Evidence has been advanced that anal achalasia and megacolon result from degeneration or disease of the effector fibres of the parasympathetic innervation of the sphincter muscle and the hypertrophied part of the colon. Overactivity of the sympathetic innervation has been postulated in some cases. The action of the parasympathetic is to produce spasm of the colon and relaxation of the anal sphincter, while the action of the sympathetic is the reverse. In anal achalasia with megacolon there is no spasm of the sphincter, but only a failure to relax, while the walls of the constipated colon are much hypertrophied.

In the past many forms of treatment have been tried, of some of which it is difficult to see the rationale. Diets containing an abundance of roughage have been prescribed, presumably in order to stimulate peristalsis in the colon; but the hypertrophy of the wall of the colon is in sharp contrast with the atony often seen in elderly constipated persons for whom roughage is of most value. Of the purgative drugs which have been recommended, most have their chief action on the small intestine; it is usually of little avail and productive of much discomfort in persons with anal achalasia if the small intestine is forced to discharge the contents abruptly into the already overloaded large intestine, which is unable to discharge them. Periodical enemata are valuable in reducing fæcal accumulations and have a place in orthodox treatment. High spinal anæsthesia has been used to release the sympathetic control and initiate defæcation. The results of the spinal anæsthesia have been used to decide the suitability of the patient for sympathectomy, and a good bowel action has been said to indicate a favourable prognosis. It is possible to account for the favourable results which have been reported from time to time from the various operations of surgery, such as lumbar ganglionectomy and presacral neurectomy, by postulating that they remove the normal physiological opponents of a weakened parasympathetic innervation; often the late results of operation are disappointing. Another simple and successful form of treatment is the use of a self-retaining anal bougie each morning for half an hour before defæcation is attempted, in order to relax the anal sphincter; a special bougie which has been successfully used at this hospital was described in THE MEDICAL JOURNAL OF AUSTRALIA, Volume II, 1943, at page 256. Various drugs have been tried: parasympathetic antagonists such as atropine and the less toxic "Syntropan", parasympathomimetics such as eserine and "Prostigmin", sympathomimetics such as ephedrine and amphetamine sulphate ("Benzedrine"), and stimulants of plain muscle such as pituitrin, pitressin *et cetera.*

Believing that anal achalasia in children might be more capable of response to drug treatment than the same disease in adults, and that the drug most likely to be effective would be one which would stimulate the effector endings of the parasympathetic together with a suitable adjuvant acting on the sympathetic system, I selected for trial "Prostigmin" on account of its low toxicity and its effectiveness as an anti-cholinesterase, together with ergotamine tartrate.

Case I.

A girl, aged four years, was brought to the hospital on account of persistence of constipation, which had been present since birth. She had been treated for it at the hospital a year previously, when the diagnosis of megacolon and anal achalasia was made. Examination after an opaque enema at that time revealed a large and redundant sigmoid colon. She was given daily treatment with the bougie for three weeks, and one month after her discharge from hospital was having daily evacuations of the bowels. Occasional use of the bougie and an occasional enema had been recommended, but had not been continued, and now she had had no treatment for six months; during the three months prior to admission to hospital she had had evacuations of the bowel only every fourth or fifth day, and the stools were very small. Aperients had been given with little if any effect. She was admitted to the hospital and treated by the oral administration of "Prostigmin" in tablet

form in a dose of 3·75 milligrammes three times a day, without effect. From the ninth day she was given in addition ergotamine tartrate in tablet form in a dose of 0·3 milligramme three times a day. From the following day until the day of her discharge from hospital, thirteen days in all, she had each day a spontaneous evacuation of the bowels when she was placed on a bed pan after breakfast. The ergotamine tartrate treatment was not continued after this, but she continued to take 3·75 milligrammes of "Prostigmin" three times a day. A week later she reported back and was still having daily evacuations. The dosage of "Prostigmin" was reduced to 3·75 milligrammes twice a day for a week, and then once a day, and a week later she was continuing to have daily evacuations.

Case II.

A boy, aged four years, was admitted to the hospital because of abdominal pains. He had had habitual constipation since birth. His abdomen was grossly distended. Examination after an opaque enema revealed megacolon. He was given enemata and laxatives for a week, with little effect. He was then given "Prostigmin" by mouth in tablet form in a dose of five milligrammes three times a day. For the next week the child had at least one bowel action daily, and on occasions as many as four. The dose was then reduced to 3·75 milligrammes three times a day, and the patient continued to have a daily action of the bowels until he was discharged from hospital. Seven weeks later he was brought to hospital at my request, and I was disappointed to find that his mother had not administered any of the tablets which had been given to her, and that his condition was precisely the same as when he was admitted to hospital.

Case III.

A girl, aged eleven years, was admitted to the hospital on account of repeated attacks of vomiting, nausea and diarrhœa, the last-mentioned following upon obstinate constipation, to which she had been subject all her life. She had been weak, tired and pale for one month. Examination after an opaque enema revealed a greatly dilated colon. The hæmoglobin value of her blood was only 27% of normal; she was given a transfusion of blood, and was seen by a surgeon, who advised that sympathectomy should be performed after the patient had spent six weeks in a convalescent home.

The patient was readmitted to hospital two months later. On her return to hospital she looked very well, and stated that her bowels had been open nearly every day since she was discharged. However, this was not so during the time that she had been in the hospital previously, and she had only seven bowel actions in the first thirty-six days after her return. It was decided on the tenth day to try medical treatment. "Prostigmin" was given by mouth in tablet form in a dose of five milligrammes three times a day. On the twentieth day ergotamine tartrate in tablet form in a dose of 0·5 milligramme three times a day was given in addition to the "Prostigmin". On the twenty-ninth day the dose of "Prostigmin" was increased to 7·5 milligrammes three times a day. On the thirty-sixth day the patient had a spontaneous action of the bowels, and from the thirty-sixth to the sixty-ninth day she had at least one evacuation daily, excepting that she had only one between the fifty-eighth and sixty-second days, during which period she had toothache and had two teeth extracted, and consequently had little to eat. On the forty-sixth day the dose of ergotamine was reduced to 0·5 milligramme per day, and it was suspended on the fiftieth day.

I saw the patient five weeks later; she had taken the "Prostigmin" tablets for eight days after leaving hospital and had then discontinued them; she was enjoying good health and was having daily bowel evacuations.

Reviews.

PROGRESS IN PÆDIATRICS.

"ADVANCES IN PEDIATRICS" is a series of ten very interesting monographs.[1] It is Volume I of a new undertaking by the Interscience Publishers, Inc., of New York. The Editor-in-Chief is Dr. Adolph G. de Sanctis, of the New York Post-Graduate Medical School and Hospital at Columbia University.

"Toxoplasmosis" is the subject of the first contribution. Although toxoplasma may occur in many types of hosts, only one immunological strain is known. Major Norman Brill, the well-known neurologist, presents all aspects of this fascinating subject, and much of it will be new to most Australian readers. It is stimulating to learn, for example, "that infants surviving an attack of toxoplasmic encephalomyelitis may erroneously be classified as congenital malformation of the brain, congenital hydrocephalus, birth injury, epilepsy, etc., unless the serologic tests which are available for the diagnosis of toxoplasmosis are carried out". No more need be quoted to demonstrate that clinicians and pathologists should read Major Brill's monograph.

In the following article Dr. Horace L. Hodes, of Baltimore, presents a masterly review of virus diseases, including poliomyelitis, virus encephalitis, influenza, virus pneumonia, diarrhœa of the newborn, measles, *herpes simplex* and *lymphogranuloma venereum*. We find that poliomyelitis is now classified as an alimentary tract disease and that flies are under suspicion as vectors. Large quantities of the virus are eliminated in the stools and the virus survives for a time in sewage.

Then comes a comprehensive description of the present position of "Chemotherapy in Diseases of Infancy and Childhood" by Dr. Benjamin W. Carey, of the Lederle Laboratories, Pearl River, New York. This article contains a great deal of valuable and important information. One point of interest is the statement that the sulphonamide synthetics appear to be valueless in the acute stage of rheumatic infections, but there is evidence to support the idea that they are of value afterwards in postponing relapses or recurrences so long as the chemotherapy is maintained.

The article on "Electroencephalography" by Major Norman Brill should interest all neurological specialists and psychiatrists. Figure 1 has as the legend, "A longitudinal study of the occipital alpha rhythm in normal children". The effects of hyperventilation in the production of dysrhythmia are described and analysed. Apparently convulsive tendencies can be demonstrated by the method even in young children before clinical manifestations have developed. Electroencephalography, even in the present state of knowledge of the method, may be invoked in the elucidation of behaviour problems in children. Slow rhythms and hyperventilation effects are more prevalent in behaviour problem children in contrast with normal controls, and it is suggested that a disturbance of cortical function may be "an important factor in the inability of the former group to adjust to environmental conditions". Also "one might expect that the so-called normal children whose electroencephalograms showed significant evidence of disturbances in the form of slow waves would be poorer risks in the face of persistent environmental difficulties".

H. G. Poncher, from the Department of Pediatrics, Chicago, Illinois, has contributed a monograph on vitamin *K* and hæmorrhage in the newborn, which is an authoritative account of this important subject. In prothrombin deficiency conditions restoration of prothrombin levels to normal invariably follows administration of adequate doses of vitamin *K*, and practically all newborn infants exhibit hypoprothrombinæmia in various degrees during the first weeks of life, spontaneous hæmorrhage occurring if the value drops so far as 20% of normal.

One of the most interesting sections of this important book contains an account by Robert Gross himself of the surgical treatment of persistent *ductus arteriosus*. The conditions laid down for selecting suitable patients for operation are set out and the operative details are included with schematic drawings. As this operation has been performed a few times in this country and is being demanded by sufferers from congenital cardiac anomalies, it is timely that we have a simple description of the indications and method of treatment.

The remaining chapters relate to premature-infant care, tuberculosis in childhood, endocrinology, and short abstracts of other advances in pædiatrics. Every section of the book is followed by an up-to-date bibliography. The book is well printed on good paper and it is in every way attractive. It is a great credit to the contributors and to the editor and his four associate editors. We may look forward eagerly and with confidence to the second and following volumes of this new production on advances in the field of pædiatrics. Every pædiatrician and most medical consultants should read the book.

[1] "Advances in Pediatrics", edited by Adolph G. de Sanctis, M.D., *et alii*; Volume I; 1943. 9" × 6", pp. 314, with illustrations and diagrams. Price: $4.50.

The Medical Journal of Australia

SATURDAY, MAY 20, 1944.

All articles submitted for publication in this journal should be typed with double or treble spacing. Carbon copies should not be sent. Authors are requested to avoid the use of abbreviations and not to underline either words or phrases.

References to articles and books should be carefully checked. In a reference the following information should be given without abbreviation: Initials of author, surname of author, full title of article, name of journal, volume, full date (month, day and year), number of the first page of the article. If a reference is made to an abstract of a paper, the name of the original journal, together with that of the journal in which the abstract has appeared, should be given with full date in each instance.

Authors who are not accustomed to preparing drawings or photographic prints for reproduction are invited to seek the advice of the Editor.

POST-GRADUATE EDUCATION IN MEDICINE.

POST-GRADUATE STUDY has for long been regarded as essential for the practising doctor, but the organization of courses of study covering a whole subject or group of subjects is comparatively new. Modern developments in post-graduate teaching have been the inevitable result of the growing complexity of medical science. Councils and committees have come into being to arrange and control courses of study, and in certain places hospitals have been given over to post-graduate teaching with staffs chosen from those of high attainment who are qualified and able to impart knowledge and direct inquiry. In London the British Post-Graduate Hospital and Medical School have come into being, and before the outbreak of war became the centre of post-graduate medical study for the Empire. In Melbourne, Prince Henry's Hospital has been set apart as a post-graduate hospital, but its full development has been delayed by the war. In Sydney, the Prince Henry Hospital has for some years been a post-graduate hospital and teaching has been carried out within its walls under the ægis of the New South Wales Post-Graduate Committee in Medicine. When the hospital was no longer available because of certain conditions arising out of the war, the Post-Graduate Committee had to leave it and carry on its activities without the aid of a special hospital. Unfortunately for those who do not wish to be students, the fighting of a war with its attendant *bouleversement* of civilian medical practice does not check the growth of medical knowledge. On the contrary, as we know full well, war creates such new and diverse conditions that in certain fields war medicine and surgery become almost a special study. Research carried out to meet the medical emergencies of war and knowledge gained in their prevention and treatment are reflected in civilian practice—the therapeutic weapons of the civilian practitioner grow in number and his skill in like measure if he has enough wisdom and discernment to study advances as they occur. Admittedly wartime conditions make it difficult for the practitioner to concentrate on study, even at irregular intervals. Unavoidable dissipation of energy in many directions and weariness of the flesh from overwork are in most instances sufficient excuse. For this and for other reasons it is not surprising to find that in some of the States the activities of the organizations that deal with post-graduate medical education have languished. The two most active bodies at the moment are the Queensland Post-Graduate Committee and the New South Wales Post-Graduate Committee in Medicine. The continued activities of these bodies is possibly to be found in the liaison that exists between each of them and the university of the State in question. We read in the last annual report of the Council of the Queensland Branch of the British Medical Association that the status of the Queensland Post-Graduate Committee was changed last year by "a measure of affiliation" effected between the committee and the University of Queensland. Post-graduate work in Queensland "continued actively" during 1943. Time, it is believed, will show that the closer the liaison between post-graduate organization and university, the more extensive and effective will post graduate teaching become. The robust health of the New South Wales Post-Graduate Committee in Medicine has shown this to be true. A year or two after its inception the New South Wales committee became allied to the University of Sydney. In accordance with its by-laws the committee is required to submit to the Senate of the University at the end of each year a report on its activities for that year. The report for 1943, recently issued, shows that post-graduate lectures were delivered during the year in the metropolitan area and that week-end courses were conducted at several country centres. The lectures in the country were well attended, and in Sydney twenty-six civilian practitioners attended one course of ten lectures on general subjects in addition to service personnel and thirty-nine attended a series of thirteen lectures. Though these figures are not large, they do, in the present state of medical practice, show that such lectures are worth while. In addition to the lectures mentioned the New South Wales Committee has taken certain steps aimed at giving effective help to medical officers of the forces in their rehabilitation. There is no doubt that in the immediate future the efforts of all post-graduate committees will chiefly have to be expended in this direction.

Everyone realizes that after a few years spent on active service with the armed forces even the experienced pre-war clinician will become rusty in certain aspects of his civilian work and will need to undergo a process of refurbishing. For the large numbers of medical officers who went soon after graduation or from a resident hospital post into the services the amount of refurbishing necessary will be considerable. These graduates with no experience of general medical practice will stand in special need of tuition at the bedside, and they will seek most of all some practical experience in obstetrics and in the treatment of children's diseases. On previous occasions mention has been made in these columns of the part that will probably be taken in the rehabilitation of medical officers by the Australian Services Education Council, a body already in being, having as one of its aims "so to give vocational guidance and training to troops that repatriation will be effected with the greatest ease and efficiency". This body, which, it is expected, will act in close relationship with the committees visualized by the Federal Council and having at their disposal the information already available to the Medical Coordination Committees, will

presumably arrange for medical officers to spend a period of some months on study leave before final demobilization. It may or may not arrange that resident posts in hospitals shall be available to those who specially need them. Even if it should relieve the post-graduate committees in the several States of this work, these committees will still have to consider the practical work already done by any whom they set out to teach. The first essential in all post-graduate education is to awaken in the intending pupil a desire to learn and a willingness to study. Once this has been done the only difficulty will be to find time and opportunity for reading, for work in the laboratory and for practical work at the bedside. The man who can undertake all three when he pleases is fortunate. Most of those in the services will have to postpone their clinical work until the cessation of hostilities or their own retirement from the services. In the meantime study of other kinds can be made possible for them, and the New South Wales Post-Graduate Committee in Medicine is helping quite a number in this way. In August last it instituted a correspondence course in medicine suitable for candidates who wish to sit for examination for membership of the Royal Australasian College of Physicians. The course was limited to fifty members. The candidates were advised to study certain sections of medicine, references to recent literature were supplied to them and they were required to pass a test examination. Their answers to the questions set were corrected and a detailed commentary was returned to each candidate. It must also be mentioned that sets of microscopic slides, together with a key, have been prepared and sent to certain units of the three medical services to help medical officers in their study. Steps are being taken to conduct a correspondence course for those desirous of taking Part I examination for the Master of Surgery degree. It must not be supposed, as has been suggested, that any particular virtue is held to lie in the pursuit of a degree or diploma as such. Dr. S. A. Smith, the Director of the Post-Graduate Unit in Medicine, puts it well when he states in his section of the committee's report that it is recognized that clinical medicine cannot be taught by correspondence. He believes, and there is no doubt that he is right, that the correspondence course has a definite value in directing the studies of entrants and in stimulating their interest in clinical medicine. One who has shown diligence in a correspondence course will be on that account the better equipped to benefit from studies in the laboratory and at the bedside at a later date. There are happily indications that courses such as those instituted by the New South Wales Committee may be started by other bodies.

One consideration remains. It is clear that both now and in the future the need in Australia for post-graduate teaching of a high order will be great. Anything therefore that can be done to increase its availability and its range should be done. About ten years ago a plea was entered in these columns for the creation of a Federal Post-Graduate Council which would be an advisory and possibly a coordinating body. No steps were taken to seize upon what appeared at that time to be an opportunity of strengthening the basis of post-graduate teaching in the Commonwealth. Whether the present is a suitable time for such a step to be taken should be considered. The question has been brought forward because of views emanating recently from New Zealand. The Committee on Post-Graduate Education of the Auckland Division of the New Zealand Branch of the British Medical Association in April, 1943, held a "post-graduate conference" and the papers read have been published in a supplementary issue of the *New Zealand Medical Journal*. In a foreword to this issue Douglas Robb discusses the future of post-graduate teaching in New Zealand. He has the praiseworthy object of trying to build up in New Zealand a post-graduate school worthy to rank with other schools of the Empire, and able to make reciprocal arrangements with them. He sees the possibility that in the days to come practitioners from Australia may care to study in New Zealand and *vice versa*. A central post-graduate council in Australia would in such circumstances be an extremely useful body. It would cement relationships with New Zealand in a way that would be impossible for a number of isolated State bodies and it would be able to bring about liaison with other post-graduate organizations overseas.

Current Comment.

RHEUMATIC PNEUMONIA.

MORE than one hundred and fifty years ago (in 1788) the occurrence of rheumatic pneumonia was mentioned by Stoll, of Vienna. It was mentioned again in 1813 by Chomel, of Paris, and ever since then references have been made to it. But even now its existence as a separate entity is not recognized. K. T. Neubuerger, E. F. Geever and E. K. Rutledge make this clear in the opening sentence of a paper on the subject.[1] In a series of 63 cases of active and quiescent rheumatic fever they found eight in which there occurred pulmonary inflammation showing distinctive features. They also review the literature since 1937. In 1930 A. D. Fraser wrote on the Aschoff nodule in rheumatic pneumonia.[2] He referred to a study by Rabinowitz in 1926 in which he could not accept the current view that pulmonary changes in acute rheumatism were secondary to cardiac insufficiency or pressure. He believed the condition to be a specific pneumonia due to the virus of acute rheumatism. Fraser states that A. E. Naish, who wrote in 1928, was the first to describe some of the histological features of this pneumonia and to emphasize its specific nature. Fraser himself described two cases of the condition in which he found typical Aschoff nodules in the interstitial tissue of the lung. He thought that the condition might pass into a chronic or quiescent stage in which the nodule would not be found. G. Hadfield in 1938 described "rheumatic lung" as a non-committal title for a condition the primary lesion of which was a widespread fibrinous alveolitis.[3] In his discussion of the histological changes he described the formation of hyaline membranes in the alveolar ducts and pointed out that the process had been described in "a strange variety of conditions". Among these conditions that he mentioned was the "acute fulminating pneumonia" of the influenza pandemic of 1918; the lesion was subsequently known as the "virus lesion". Hadfield did not mention Aschoff nodules. Another important contribution to this subject was made by E. Z. Epstein and E. B. Greenspan.[4] The authors were definite in the opinion that a specific rheumatic lung or rheumatic pneumonia would not be considered to exist. They concluded, however, that there occurred in the lungs a characteristic, though not specific, pulmonary picture consisting of alveolitis, marked congestion, œdema, engorgement and the formation of hyaline membranes. They found no Aschoff bodies.

[1] *Archives of Pathology*, January, 1944.
[2] *The Lancet*, January 11, 1930, page 70.
[3] *The Lancet*, September 24, 1938, page 710.
[4] *Archives of Internal Medicine*, Volume LXVIII, 1941, page 1074.

Neubuerger and his co-workers describe the distinctive features in their eight cases as comprising focal alveolitis with necrosis, fibrinous exudation and the formation of hyaline lining membranes, arteriolitis, mononuclear cell exudation and septal cell proliferation, and the presence of peculiar granulomata in the alveolar ducts and alveoli. The clinical symptoms in their cases were indefinite, and they think that cases in which the picture is one of acutely developing lobar pneumonia, as described by some authors, are probably rare. The syndrome consisted of fever, cough, bloody sputum and leucocytosis. The granulomata are stated by Neubuerger and his collaborators to be identical with the *bourgeons conjonctifs* described by Masson, Riopelle and Martin. These observers did not see typical Aschoff bodies, but look on the granulomata as their equivalents. They point out that both Aschoff bodies and the granulomata are well-defined bodies of approximately similar size. The cellular components show a tendency towards polarity; the stroma is loose, delicate and mucoid, and contains varying amounts of fibrin, lymphocytes, polymorphonuclear leucocytes and fibroblasts. There are fundamental differences. Aschoff bodies are located in the interstitial connective tissue, whereas the pulmonary granulomata are within ducts and are in part intraalveolar. Typical Aschoff cells are not found in the granuloma, which contains a different type of large cell. Neubuerger and his colleagues think that their granuloma should be known as the "Masson body". They also point out that some histological features in their series are suggestive of virus as a cause. These changes included "the presence of large numbers of mononuclear cells in the exudate, stimulation of septal cells with lining of alveoli with septal cells and vascular damage". This recalls Hadfield's observations on the "virus lesion". Some workers, of course, think that a virus may have a share in the causation of acute rheumatism. The riddle of so-called rheumatic pneumonia still remains to be solved.

SYMPTOMLESS GALL-STONES.

GALL-STONES are present in the gall-bladders of many persons who appear to suffer no inconvenience on that account. Rolleston has stated that in routine post-mortem work gall-stones are usually found in 10-5% of the subjects; much the same kind of figure has been given by other authors. As long ago as 1913 D'Arcy Power wrote that for every patient operated on for gall-stones there would be at least ten who suffered from gall-stones and were allowed to go without operation. That gall-stones may have effects which vary in severity will appear natural when we remember their three chief causes—stagnation of bile, bacterial invasion, and an altered composition of the bile consequent on an increase in the cholesterol content of the blood. While the cholecystitis accompanying the gall-stones of one man may subside and never cause him any further inconvenience, his neighbour may not be so fortunate. Faced with a serious and perhaps lethal condition originating in the biliary passages, he will probably wish when it is all too late that he had done something about his original gall-bladder inflammation. There is reason then for the paying of some attention to gall-stones that are not producing symptoms.

E. D. Truesdell, of Saint Luke's Hospital, New York, has recently presented to the New York Surgical Society a study on the frequency and future of gall-stones believed to be quiescent or symptomless.[1] He reviews a series of five hundred cases in which palpation of the gall-bladder was carried out during surgical operations on women for conditions other than those related to that structure. By direct palpation through cœliotomy incisions gall-stones were found to be present in fifty, or 10%, of the 500 women. He thinks that there is good reason to suppose that the actual percentage of occurrence among the women may have been even higher than ten. It is quite likely that in some instances stones actually present were not detected by palpation. It is not uncommon to find in a gall-bladder removed at operation stones whose presence was not detected during operation. Again in most cases in the series examination was carried out through a lower abdominal incision—a fact which did not facilitate palpation—and conditions of and around the gall-bladder sometimes made it difficult to appreciate the presence of stones. Against these facts, Truesdell points out, must be placed the fact that the investigation was carried out on women only, most of whom had had pregnancies and most of whom were at an age when biliary disease is most commonly experienced. Considering all the factors, Truesdell is of the opinion that the 10% incidence of gall-stones discovered by him is probably typical of the incidence generally. It tallies with the figure given by Rolleston. Truesdell distinguishes between gall-stones which have "asserted their presence" on one or more occasions, but at intervals of considerable duration, and those which have never caused symptoms. These he calls the quiescent and symptomless types. In his group of fifty cases there were satisfactory examples of each. Thirteen of the fifty cases occurred in persons between the ages of thirty and thirty-nine years, and twenty occurred in persons between the ages of forty and forty-nine. An effort was made to discover among members of the group at least a few who might be regarded as suffering from symptomless gall-stones and others whose condition might be regarded as quiescent. The trouble was that the presence of gall-stones was known. Minor disturbances, which in ordinary persons would have passed unnoticed, were easily attributed to the gall-bladder; the difficulty of determining a complete absence of symptoms may be readily appreciated. Only six of the original fifty patients may be listed as having been free from all symptoms from the time that the stones were discovered until the time when Truesdell wrote. In two of the six cases it was possible to be quite certain of the entire absence of gall-bladder symptoms in the past history, and no symptoms were noted while the patients were under observation. Of the fifty patients, six received immediate treatment for their gall-stones. In five of these cases the gall-bladder was removed; in the sixth a solitary small stone was present and the gall-bladder was closed after it had been incised for removal of the stone. Eight patients of the fifty were lost to the investigation because of death. Five died within a month, two died before two years had elapsed and one survived for more than five years. Of the eight, four were free from symptoms as far as was known. Twelve patients sooner or later returned for removal of the gall-bladder. Four developed acute symptoms during the first year after discovery of the stones, four during the second year, and four at intervals of two years and ten months, five and a half years, six years and eight years respectively. Contact was lost with twelve patients, but six were free from gall-bladder symptoms when last seen. Twelve of the patients continued under observation. Six of these had had one or more attacks of biliary disease or were having symptoms when Truesdell wrote. The periods of observation ranged from four to fifteen years, and the patients are regarded as belonging to the quiescent gall-stone group. The six remaining patients are believed to have had no symptoms during periods of observation of 20, 15, 13, nine, three and three and a half years. These are the six previously mentioned as having been free from symptoms.

This series of cases is instructive. The first point that most clinicians will raise is the variability of what patients will regard as symptoms of illness. Flatulence and slight discomfort which are symptoms to one person may be disregarded by another. This has a bearing on the existence of a symptomless group. It appears that a small and solitary round stone may, as Truesdell states, remain in the gall-bladder without producing symptoms or bringing about pathological changes in the gall-bladder. Such small solitary stones are not often found and very few patients in Truesdell's series "escaped the consequences of retaining their stones". As a person with gall-stones grows older, the risks of cholecystectomy do not become less, and with increasing age there is a greater likelihood that pathological changes will involve the biliary system. Truesdell's observations show that a gall-bladder containing gall-stones should be removed.

[1] *Annals of Surgery*, February, 1944.

Abstracts from Medical Literature.

PATHOLOGY.

The Value of the Vaginal Smear in the Diagnosis of Uterine Cancer.

WITH the methods described by Papanicolaou, J. V. Meigs, R. M. Graham, M. Fremont-Smith, I. Kapnick and R. W. Rawson (*Surgery, Gynecology and Obstetrics*, November, 1943) have studied one or more vaginal smears in 220 cases. No cancer cells were found in smears taken from 153 women. Smears were taken from these patients either because they were in the cancer age or because of symptoms of vaginal bleeding or discharge. Of these, 79 had biopsies, curettage or hysterectomy with negative tissue diagnosis for cancer. The remainder of these patients with "negative" smears did not present enough evidence for malignant disease to require operative procedures. A histological diagnosis of uterine carcinoma was made in 62 cases. Forty-six of these patients were found to have carcinoma of the cervix. Forty of these cancers were epidermoid. There were three each of adenocarcinoma and adenocanthoma. In 45 of the 46 cases of proved cancer of the cervix, positive vaginal smear diagnoses were made. Ten cases were classified as early (1A) cervical carcinoma. Twelve patients had endometrial cancer. Ten adenocarcinomata and two adenocanthomata were found. Five were classified as early cancer. Of the twelve cases of endometrial cancer, eleven were diagnosed with vaginal smear. Epidermoid cancer of the vagina was found in three patients whose vaginal smears were positive. Cancer cells were found in the vaginal smear taken from one patient who had a cancer of the rectum and a recto-vaginal fistula. In view of the negative findings on examination of the uterine tissue obtained by curettage the authors concluded that the tumour cells probably came from the rectal cancer. Of 153 "negative" cases, positive smears were reported in four—an error of 2·6%. Vaginal smears diagnosed as positive were taken from five patients who have not yet come to operation. These cases are classified as incomplete. The authors believe that by vaginal smear examination uterine cancer can be diagnosed in an early stage.

Acquired Hæmolytic Anæmia.

V. R. MASON (*Archives of Internal Medicine*, October, 1943) reports a series of cases of acute or chronic hæmolytic anæmia of the acquired type characterized by more or less rapid destruction of erythrocytes. Splenomegaly is constant, and it is probable that the destruction of blood occurs chiefly in the spleen. There is a pseudomacrocytic blood picture, usually with a high colour index. Large numbers of macrocytes and microspherocytes are present in the blood film during the hæmolytic crises in the acute type of the disease or constantly in the chronic type of the disease. The red cells may show extreme osmotic fragility, or they may be normally resistant to hypotonic saline solutions. This abnormality is not related to the number of spherocytes in the circulating blood. The blood may or may not contain autoagglutinins or autohæmolysins. The disease is neither hereditary nor congenital, and no ætiological factor has been determined in any of the reported cases. The acute type of the disease has been reported as Lederer's anæmia. Subacute and chronic types are probably more frequent than is commonly believed. The disease may heal spontaneously, or it may be cured by transfusions or by splenectomy. The more chronic types of the disease may or may not be cured by removal of the spleen. During the serious hæmolytic crises often seen in the disease removal of the spleen may be lifesaving even if it does not lead to complete cure.

Hereditary Multiple Exostosis.

HEREDITARY multiple exostosis is, according to H. L. Jaffe (*Archives of Pathology*, October, 1943), a congenital anomaly of skeletal development. The lesions tend toward bilateral and symmetric distribution and appear in juxtaepiphysial areas. There is a positive relation between the severity of involvement of a particular juxtaepiphysial part and the activity of skeletal growth in that area. The involvement of the long tubular bones (especially of the lower limbs) is greater than that of the trunk bones. Peculiar curvature and deformity of the forearm frequently develop in this disorder. Chondroscarcomatous transformation of one or another of the exostotic areas is not uncommon, particularly in adult subjects, having occurred in three of 28 cases. The exostotic area is not superposed on a delimiting cortex, but represents an outpouching of the cortex of the affected region. Where the lesion is growing, the surface of the outpouched area presents a zone of hyaline cartilage at least several millimetres thick, with active endochondral ossification on its under side. Where the lesion is no longer growing, there may be only a narrow zone of nonproliferating cartilage which rests on a thin plate of bone, or the surface may consist merely of a thin plate of bone not capped by cartilage. The tissue beneath the cortical cap is spongy bone in which the trabeculæ tend to be delicate and are interspersed with marrow, which on the whole is fatty marrow. Islands of calcified cartilage may accumulate locally because endochondral ossification of the cartilage cap has been disturbed in the area. Such a focus does not represent enchondroma. As to the genesis of multiple exostosis, Keith's theory of defective modelling of the bone (diaphysial aclasis) and the conception of perverted periosteal and perichondral activity not only are mutually compatible, but reinforce each other in explaining the evolution of the lesions. As to the hereditary aspects, about half of the offspring of an affected subject manifest the disorder. The disorder may be transmitted through unaffected females in a family tree—a fact which explains in part the excess of affected males over affected females (in a ratio of about 7:3). As to treatment, the presence of multiple exostosis is not in itself a reason for intervention against the lesions, but when an exostotic area is excised because of some local difficulty that it is causing, it should be removed intact with its fibrous periosteal coat as a precaution against recurrence.

The Goitre Heart.

IN experimental studies planned to determine whether anatomical changes can be demonstrated in the hearts of animals with simple goitre, no histological changes, according to C. Alexander Hellwig (*Archives of Surgery*, January, 1944), were found in the hearts of goitrous animals which would suggest a direct toxic effect of goitre on the myocardium. Lymphocytic infiltration, degeneration of muscle fibres and scar formation were common in the hearts of the animals, but since they were as often encountered in the hearts of the nongoitrous controls, they have to be explained by causes which were active in all three groups, possibly some intercurrent infection. The only positive anatomical finding was a significant hypertrophy of the left ventricle in the animals which received a diet rich in calcium. This observation suggests that left ventricular strain in endemic goitre may be due to a direct effect exerted on the heart muscle by the same factor which is responsible for the development of goitre—for instance, an excess of calcium in the food. The results of these experiments, the author states, are in accord with the experience of most observers that there is no anatomical type of endemic goitre which predisposes to cardiac complications.

Liposarcoma: The Malignant Tumour of Lipoblasts.

ARTHUR PURDY STOUT (*Annals of Surgery*, January, 1944) reports a group of 41 cases of liposarcoma studied in connexion with 134 previously reported cases. These tumours tend to form very large bulky masses, with a predilection for the thigh and extraperitoneal tissues, but with occasional appearance in many other regions as well. They exhibit great variations in growth speed, they are sometimes multiple, and the more malignant forms metastasize usually to either the lungs or the liver. Grossly, these tumours are frequently mottled with yellow because of their lipoid content and are often slimy from the formation of mucoid material. Microscopically, they can be divided into one well differentiated, less malignant group, which simulates the appearance of ordinary embryonal fat, and three other poorly differentiated more malignant groups, resembling respectively atypical ordinary embryonal fat, atypical brown fat with the formation of rounded lipoblasts, and finally a group showing both of these elements in combination. Probably as a result of metaplasia these tumours can on occasion form other tissues such as reticulin and bone. This versatility suggests that there are probably not separate embryonal stem cells for adipose tissue and brown fat, but that both spring from a common ancestor segregated from the primitive mesenchyme.

Granulomatous Prostatitis.

A GROUP of inflammatory lesions occurring in surgically removed prostatic tissues presented, according to F. H. Tanner and J. R. McDonald (*Archives of Pathology*, October, 1943), the general microscopic picture of granuloma and could have been con-

fused histologically with certain specific granulomatous lesions, particularly those of tuberculosis. The genesis of the granuloma in question, judging primarily from histological studies of surgically removed tissue, but aided by clinical, bacteriological, serological and post-mortem observations, they believe to be as follows: (i) partial obstruction of some of the prostatic ducts takes place and is caused either by primary inflammation in them (or inflammation coincident with prostatitis and urethritis) or by mechanical pressure resulting from benign nodular hypertrophy; (ii) stasis takes place in smaller ducts and acini, with subsequent intraluminal infection of a chronic, non-specific type; (iii) the epithelial lining and walls of ducts and acini are destroyed, with escape of inflammatory products and altered prostatic secretions into the interstitial tissues; (iv) a diffuse or local chronic inflammatory reaction is produced, *plus* a "foreign body" type of inflammation, with influx of numerous giant cells, foam cells, plasma cells and lymphocytes; (v) a variation of the fourth process occurs, wherein the chronic inflammation remains longer within the boundaries of duct walls and forms circumscribed nodules of a granulomatous nature, associated with changes in the mononuclear cells to produce pseudo-tubercles; (vi) slow resolution of the lesion occurs in some portions, with complete loss of glandular parenchyma and marked replacement with fibrous tissue.

MORPHOLOGY.

Development of Hypophysis.

E. L. HOUSE (*The American Journal of Anatomy*, July, 1943) gives an account of the development of the hypophysis in the ox with special reference to the origin and development of Wulzen's lobe found in ruminants. Wulzen's lobe is a protuberance of the *pars intermedia* extending into the residual lumen towards the *pars glandularis*. Histologically it is different from the *pars intermedia*. The present author finds that it is formed by the vascularization of an area of mesenchyme included between the *pars neuralis* and *pars intermedia* and the growth into it of epithelioid cords from the *pars intermedia*. The conditions determining the differentiation of acidophile cells in the *pars intermedia* (Wulzen's lobe) are discussed.

Genital Tract Mitosis during Œstrus Cycle.

I. G. SCHMIDT (*The American Journal of Anatomy*, July, 1943) has studied the amount of proliferation in the various reproductive organs of the guinea-pig at different times during the œstrus cycle and with special reference to the time of ovulation. It has been found that a single injection of colchicine inhibits mitotic divisions in the metaphase stage for as long as eighteen hours, so that a study of the amount of proliferation in the various reproductive organs gives an accurate indication of activity during a uniform period of time. The author finds that in the fimbriated portion of the uterine tube and in the ampulla and isthmus, maximal epithelial proliferation occurs soon after ovulation. Mitotic division continues subsequently at a lower level through the fourth day in the fimbriated region and through the eighth day in the ampulla. Secretion by the cells occurs during this period, and mitoses are also encountered in the endothelium of the small vessels in the *tunica propria* and surrounding muscle. Similar observations are made on the uterus and vagina. There is a great proliferation of cells in the uterus in the second or third day after œstrus and in the vagina during proœstrus. Cessation of mitosis and sloughing of the mucous and cornified layers reduce the vaginal epithelium to its diœstrous thinness by the fourth day.

Conducting Tissue in Heart of Hedgehog.

E. W. WALLS (*The Journal of Anatomy*, July, 1943) describes the specialized conducting tissue in the heart of the common hedgehog. The limitation of the sino-atrial node to the right side of the sino-atrial junction is noted, despite the presence of an interseptovalvular space. The sino-atrial node and atrio-ventricular node are not connected directly by any strand of specialized tissue. Nerve elements in relation to the specialized tissue are described. Certain features in the gross anatomy of the heart are described.

Pregnant Hermaphrodite Rabbit.

E. M. SHEPPARD (*The Journal of Anatomy*, July, 1943) describes a case of a pregnant hermaphrodite rabbit. It is the first recorded. There were a separate ovary and testis (the latter in a scrotal sac) on each side of the body. The female organs were typical of those of a normal female, except for the external genitalia which were of an intersexual type; the male organs were represented by degenerate testes only. Histological examination of the tissues of the reproductive system showed that the female organs were quite normal, but that the testes were undergoing fatty degeneration. The type of intersexuality exhibited by the hermaphrodite is that of a genotypic female, in which the sex-determining gene complex includes "quickly elaborating" male-determining genes, and "slowly elaborating" female-determining genes.

Multiple Congenital Anomalies in a Stillborn Infant.

L. M. ASHLEY AND G. E. RICHARDSON (*The Anatomical Record*, August, 1943) describe a monster which presented the following eighteen anomalies: inferior gnathoschisis, bifid tongue, anophthalmia, cleft face (including cleft nose), harelip, cleft palate, acrania, anencephalic masses, ambiotic adhesions, adherent placenta (fused to skull), right clubfoot, pendulous erupted incisor tooth, absent parotid glands, aberrant thymus tissue on surface of neck, misplaced innominate vein (anterior to clavicle and sternocleidomastoideus), absence of pendent part of great omentum, atrophic ovaries, and free zygomatic bones. According to the authors, the literature discloses no case of multiple anomalies comparable to the one here reported. They cite the incidence of the rarer anomalies and give evidence favouring an endogenous origin for the majority of congenital deformities and discrediting the view that syphilis and gonorrhœa are ætiological factors. Possible causes of the initial germinal defects responsible for monster formation are briefly considered and include excessive exposures to cold, radiations, toxins and fevers. It is admitted that extrinsic factors may at times be of ætiological significance.

Visceral Branches of Abdominal Aorta.

E. W. CAULDWELL AND J. A. ANSON (*The American Journal of Anatomy*, July, 1943), as the result of a study of the topography of visceral branches of the aorta in 300 cadavera, present statistical information on the following: (*a*) points of origin of the visceral arteries with reference to the vertebral bodies and intervertebral disks; (*b*) distances between arterial origins and the aortic bifurcation; (*c*) distances between arterial origins and the cœliac trunk; (*d*) distances between other visceral branches; and (*e*) topography of paired visceral aortic branches.

Histogenesis of Arteries.

A. F. W. HUGHES (*The Journal of Anatomy*, July, 1943) gives an illustrated account of the histogenesis of the main arteries of the chick embryo from the time when their structure develops beyond the stage of the simple endothelial wall to the end of the incubation period. He attempts to establish the causal connexions between form and function in blood vessel development. The mechanical tensions set up in the wall of the vessels by the passage of the blood stream through it are a necessary condition for the differentiation of tension-bearing elements within the vessel wall, but there are other factors which are probably related to the position in the embryo and the influence of neighbouring structures.

Endoneural Œdema in Constricted Nerve.

P. WEISS (*The Anatomical Record*, August, 1943) reports observations on intraneural œdema, made in the course of nerve splicing experiments. Chronic constriction of a nerve produces persistent œdema in the endoneural spaces and it is neither of vascular nor of irritative origin. It results from the damming up of fluid normally present in the endoneural spaces and seeping distad. The pulse wave may hypothetically be assumed to furnish the propulsive force for this seepage. The endoneural fluid seems to have special significance in nerve regeneration, inasmuch as it forms a superior growth medium for the out-growing sheath cells and nerve sprouts and also has anti-fibrotic properties.

Pick's Disease.

N. MALAMUD AND R. W. WAGGONER (*Archives of Neurology and Psychiatry*, September, 1943) report on two additional families which offer further evidence of the inheritance of Pick's disease, and outline the manner in which the distribution of the changes in the cerebral cortex coincides with certain of Brodmann's cytoarchitectonic fields, and of Flechsig's myelogenic fields. The condition develops as a system disease in the genetically youngest cytoarchitectonic regions, with corresponding disturbances in the highest cortical functions.

Medical Societies.

MELBOURNE PÆDIATRIC SOCIETY.

THE thirty-eighth annual meeting of the Melbourne Pædiatric Society was held at the Children's Hospital, Carlton, Melbourne, on March 8, 1944, DR. ALAN MCCUTCHEON, the President, in the chair.

Diaphragmatic Hernia.

DR. HENRY J. SINN said that the subject he wished to discuss and to demonstrate by pathological specimens and the presentation of a living patient, was diaphragmatic hernia. He was glad in one way that the condition had been mislabelled "eventration of the diaphragm" in the circular sent out to members, because it gave him an opportunity to dispel doubts about the nomenclature. The term "eventration" had been used loosely; but most looked upon it as signifying simply a congenital elevation of the diaphragm without any abnormal communication between the thoracic and abdominal structures. Diaphragmatic hernia, of course, referred to the displacement of abdominal organs from their normal position in the abdomen to an abnormal position in the thorax through an abnormal opening in the diaphragm or through the enlargement of a normal opening.

Dr. Sinn said that he wished to discuss a few points about diaphragmatic hernia in general. Diaphragmatic hernia might be met with at any age, more especially in the newborn. It was usually congenital, but it might be acquired. It might be right-sided or left-sided, but was more frequently the latter. The condition might be symptomless; but usually at one time or another symptoms referable to the cardio-respiratory system, such as dyspnœa and cyanosis, or to the alimentary tract, such as vomiting and abdominal pain, made their appearance. In the former case, the condition was frequently mistaken for congenital heart disease or atelectasis; in the latter, for dyspepsia and gastritis. The diagnosis was in some cases easy, especially when there were clinical signs of displacement of the mediastinum accompanied by a tympanitic percussion note and gurgling sounds over an area of the chest. In other cases, such as that of the patient who was to be shown, radiological evidence was necessary. The mortality rate was high. This was apparently due to the difficulty of making an early diagnosis and to the technical difficulties of the operation.

Dr. Sinn said that the best classification of the various types that he could find was the following:

Congenital Hernia.

(a) Hernia through the pleuro-peritoneal hiatus (foramen of Bochdalek).

(b) Hernia through the dome of the diaphragm.

(c) Hernia through the œsophageal orifice: (i) thoracic stomach, (ii) paraœsophageal hernia.

(d) Hernia through the foramen of Morgagni (retro-sternal or parasternal).

Acquired Hernia.

(a) Traumatic.

(b) Non-traumatic (for example, inflammatory necrosis).

Dr. Sinn said that his interest in the subject was aroused by a case presented to the society by Dr. Mona Blanch in June, 1941, and subsequently by Dr. J. G. Whitaker in September of that year. His interest was heightened six months prior to the meeting, when an obstetrician friend asked him to perform an autopsy on a newborn baby, whom he suspected of having dextrocardia. To his surprise Dr. Sinn found that the entire left side of the thorax was filled with abdominal contents. He took some pains to secure such a trophy, and had much pleasure in displaying it for the inspection of the members of the society. Dr. Webster had also kindly permitted him to show two specimens from his inimitable collection in the Children's Hospital museum. The first of these was a large left diaphragmatic hernia in a small baby, and the second was an example of the so-called thoracic stomach. In the case of the newborn infant, the history was that the baby was born cyanotic and dyspnœic. He remained so till his death, a few hours after birth. The obstetrician noticed that the cardiac impulse was on the right side of the chest and diagnosed dextrocardia. He gave an intracardiac injection of adrenaline without success. The history obtained with the first museum specimen was that the baby was born cyanotic and dyspnœic, and was subject to attacks during which the cyanosis deepened. The condition was diagnosed as atelectasis. He died on the seventeenth day, and the diaphragmatic hernia was found at autopsy. In the case of the second museum specimen, a resident medical officer at the hospital named Sinn, in his early days there had been confronted with a three weeks old baby with a history of vomiting in a projectile fashion since the eighth day of life. The "resident" had no hesitation in diagnosing pyloric stenosis; but his hopes were soon dashed by the radiological investigation, which revealed a congenitally short œsophagus and a thoracic stomach. The vomiting never abated, and the baby died from inanition two months after admission to hospital. That was when Dr. Webster had obtained the second specimen shown.

Dr. Sinn said that the literature on the subject was extensive. It was of interest to note that the first case was described in 1579 by Ambroise Paré, that modest surgeon who had exclaimed that he merely dressed the wounds, God healed them. Paré's case was traumatic and followed a stab wound. Dr. Sinn said that a Melbourne graduate, Sir Thomas Dunhill, had in 1935 written in *The British Journal of Surgery* an unexcelled account of the subject. Sir Thomas Dunhill studied 25 patients, 14 of whom had congenitally short œsophagi. Of the 11 with œsophagi of normal lengths, eight were submitted to operation. Of these, two died, one from pulmonary embolism ten days after the operation, and the other of pneumonia four weeks after the operation. All the patients were adults. Sir Thomas Dunhill said that those patients with congenitally short œsophagi suffered in devious ways, and their treatment had to be in the main symptomatic. Some only required occasional advice; in other cases a mercury bougie was of help; in other cases again a dilating bag should be passed, under vision. In those cases associated with an œsophagus of normal length, operation freed the patient from danger and completely relieved the symptoms. The operation was not without some risk; this was not greater than one would expect, while without operation the symptoms were very distressing and the risk of a fatal termination was probably more frequent than when operation was performed. Dr. Sinn said that Sir Thomas Dunhill's article was illustrated by good drawings and X-ray films.

In the local literature there had appeared the Blanch-Whitaker case of 1941 and a report of a similar case by a former resident medical officer at the hospital. Dr. T. E. Wilson, with two other authors; this report had appeared in THE MEDICAL JOURNAL OF AUSTRALIA on August 16, 1941. It concerned a man, aged twenty years, with a right-sided hernia. Jaundice was the presenting symptom. Hepato-splenomegaly was present. Operation was not attempted, and the condition was verified at autopsy. However, one of the most interesting reports of the condition was to be found in *Archives of Surgery* of June, 1939; in that journal Miller, Parmelee and Sandford had reported two cases. The first case so resembled that of the newborn baby and the patient to be shown that Dr. Sinn asked permission to reproduce the details. The child was first examined at the age of three months, when he had a history of vomiting and of difficulty with his feedings. The diagnosis was rendered easy by the clinical examination, which revealed displacement of the mediastinal structures and a tympanitic note and gurgling noises audible over the left side of the chest. The diagnosis was easily confirmed by plain X-ray examination of the chest and especially by X-ray examination after a barium meal. At the age of three months, operation was performed, the combined approach being used. The operation was highly successful, as could be seen from the subsequent X-ray films taken one day, three weeks, and two years and eight months after the operation. The photograph of the healthy child at the age of two years and eight months completed the picture. Dr. Sinn said that lest the surgeon be encouraged too much, he would quote the authors' experiences with their second case, which was one of right-sided paraœsophageal hernia. Diagnosis was not easy, operation on three occasions was unsuccessful and death was the ultimate outcome. Dr. Sinn further said that lest the surgeons be discouraged too much, he would refer them to a *résumé* by John B. Hartzell in *The American Journal of Surgery* of June, 1940, of 68 cases occurring in children under the age of ten years and treated by operation. In this series 46 out of 68 patients survived the operation. For the most exhaustive treatise on the subject of diaphragmatic hernia, Dr. Sinn referred the members to an article by Stuart W. Harrington, of the Mayo Clinic, in *The American Journal of Surgery* of November, 1940.

Dr. Sinn then went on to show a boy, aged eleven months, who had been admitted to the hospital on January 6, 1944. The boy had been vomiting for two days. He had been breast fed and had suffered no illness previous to his admission to hospital. On examination at that time he was slightly dehydrated, the temperature was 101·5° F. and the diminished breath sounds, dull percussion note and the few crepitations audible over the base of the left lung led to a tentative diagnosis of left basal pneumonia. The slow resolution of the signs at the base of the left lung prompted a radiological survey, and by this, owing to the astuteness of the radiologist, the underlying congenital herniation of the intestines through the diaphragm was discovered. Dr. Burgess was quick to observe the peculiar shadows in the left side of the chest, especially the unusual number of air pockets present. His suspicions were verified when an opaque meal was given and the whole lesion was laid bare. This revealed that the position of the stomach was intra-abdominal, though that organ was malrotated. The small and large intestines were crammed up into the left side of the thorax, and displaced the mediastinal structures grossly to the right. Concerning the subsequent history of the child, Dr. Sinn said that the vomiting had settled down after ten days and had not recurred. On examination, the apex beat was not determinable, but if the flat of the hand was placed on the chest the cardiac impulse was felt on the right side and not on the left. The percussion note was tympanitic over the upper lobe of the left lung anteriorly and at the base of the left lung posteriorly. With patience one could occasionally hear borborygmi on auscultation.

DR. H. DOUGLAS STEPHENS said that he had operated on five patients with diaphragmatic hernia. In his experience the herniation took place usually through Bochdalek's foramen, but at operation it was a difficult matter to be sure where the opening was. In his cases it was usually at the side. Also one noticed that the appendix was frequently the highest point in the hernia. The large bowel must therefore have great mobility. In many cases there was an associated mesenteric anomaly. Dr. Stephens said that one of his five patients came from New South Wales. The chest had been aspirated previously, but no fluid had been obtained. After the child had spent two hours in his consulting rooms, Dr. Stephens said he was able to hear borborygmi. At operation the diaphragm was very thin. However, he was able to reduce the hernia and repair the opening. The child returned twelve months later and died. At autopsy it was found that another hernia had occurred posterior to the original site. This patient was the only one of the five that succumbed. In two of the other cases Dr. David Officer Brown had given the anæsthetic, very capably maintaining the required pulmonary pressure. In one case Dr. Stephens said he contemplated removal of the spleen; but finally he decided to enlarge the incision, and succeeded in pushing the spleen along with the intestines back into the abdomen and then sewing up the opening. Another child fractured his thigh. On general examination, a diaphragmatic hernia was found. Operation was suggested, but the parent decided to the contrary. Dr. Price had told Dr. Stephens of another patient who had been brought to the hospital in a moribund state. A great proportion of these patients succeeded in reaching adult life with a minimum of discomfort.

Dr. Stephens said that he had seen several paraœsophageal herniæ; these always had a sac, but the others did not as a rule. The reason for this, according to some writers, was that they ruptured through the juncture of the pleura and peritoneum before the two had actually met. Those herniæ occurring later in life had a sac. The paraœsophageal herniæ were difficult. Dr. Stephens recalled operating on two children in one family; both died. At the operation it was possible to see the strong suction exerted on the stomach tending to draw it into the thorax. Dr. Stephens said that he had seen only one hernia occurring into the anterior portion of the mediastinum; the patient died before operative treatment could be instituted. Dr. Stephens recalled with pleasure presenting patients with diaphragmatic hernia at a congress of the British Medical Association in the presence of Sir Thomas Dunhill. Dr. Stephens thanked Dr. Sinn for bringing the subject forward, and for his excellent array of specimens. In cases of congenitally short œsophagus, all he had done was to paralyse the diaphragm.

DR. KEITH HALLAM said that the type of hernia associated with a congenitally short œsophagus was common; in fact, some radiologists had given up reporting its presence in elderly people. The condition was usually symptomless and was found inadvertently. When a small knuckle of stomach lay above the diaphragm, this was different. It might become distended with gas, producing anginal symptoms, and would need relief. Dr. Hallam congratulated Dr. Burgess on his excellent pictures. It would be interesting to follow up such a patient from year to year and to note what position the bowel took up in after life.

DR. ROBERT SOUTHBY congratulated Dr. Sinn on his able presentation of the subject. He said that in the review of the local literature, Dr. Sinn had overlooked a case of diaphrgamatic hernia reported in THE MEDICAL JOURNAL OF AUSTRALIA many years earlier by Dr. H. Boyd Graham and himself. Dr. Southby recalled that in that instance the child had frequently attended the out-patient department complaining of pallor and vomiting. He was at first regarded as suffering from cylical vomiting. Blood examination verified the presence of anæmia. This responded to iron therapy. But the child was subject to attacks in which he experienced pain and vomiting almost to the point of collapse. During one severe turn of this nature he was seen by Dr. Ralph Allen in the casualty department. Whilst he was under observation, there was suddenly a gurgling sound and the condition of the child immediately improved. His mother commented that this sudden relief from his symptoms frequently occurred. Dr. Allen then made a diagnosis of diaphragmatic hernia. Radiological examination, however, gave inconclusive results. This led Dr. Southby to remark that not all cases of diaphragmatic hernia could be diagnosed by means of X rays. The child's turns persisted and he subsequently died from bronchopneumonia. At the autopsy Dr. Southby found a great sac filling out the right side of the chest. Finally Dr. Southby asked Dr. Sinn, in his review of the literature, whether he had formed any opinion on the cause of the anæmia, and whether the anæmia occurred more frequently in herniation on the right side than on the left.

DR. MONA BLANCH said that the child in whom she was interested had occult blood in the fæces, and she thought that this was the main factor contributing to the anæmia. She had seen the patient a few days earlier. He appeared reasonably well and was anxious to join the boot trade.

DR. J. N. BURGESS said that when the child was suspended by the arms to assist return of the bowel to the abdomen, he noticed that there was descent to the level of the left hilum of the lung, but no further. His impression was that the bowel became jammed at that site, or was possibly tethered by adhesions. He was able to demonstrate movement in the upper lobe of the left lung, but he was uncertain about the lower lobe. He noticed that only the stomach and part of the colon remained in the abdomen. The former organ was rotated considerably.

Dr. Sinn, in reply, thanked the various speakers for contributing to the discussion. The cause of the anæmia which occurred in some of the cases had excited considerable controversy when Dr. Blanch had presented her patient in 1940, and various reasons had been suggested by other writers on the subject. It appeared that, as in other states, various factors were involved. The anæmia was usually of the microcytic type, and this was due to insufficient iron intake combined with imperfect assimilation because of vomiting, hypochlorhydria and physiological inactivity of the malplaced stomach. Loss of blood as demonstrated by the benzidine reaction of the stools was a big factor in many instances. This blood loss was due to oozing from a congested gastric or intestinal mucosa rather than to actual ulceration. Dr. Sinn said that he could not speak with authority, but his impression whilst reviewing the literature was that anæmia accompanied a right-sided hernia much more frequently than it did a left-sided hernia.

(To be continued.)

The Royal Australasian College of Physicians.

ANNUAL MEETING.

THE sixth annual meeting of the Royal Australasian College of Physicians was held at Sydney on Friday and Saturday, April 21 and 22, 1944.

The Council of the College is now constituted as follows: President, Dr. Harold Ritchie (N.S.W.); Vice-Presidents, Major-General F. T. Bowerbank (N.Z.), Dr. S. A. Smith (N.S.W.) and Dr. A. E. Rowden White (Vic.); Censor-in-Chief, Dr. S. O. Cowen (Vic.); Honorary Secretary, Dr. C. G. McDonald (N.S.W.); Honorary Treasurer, Dr. A. H. Tebbutt (N.S.W.); Past President, Sir Trent Ch. de Crespigny (S.A.);

Councillors, Sir Charles Blackburn (N.S.W.), Dr. O. A. Diethelm (N.S.W.), Colonel J. G. Hayden (Vic.), Dr. Konrad Hiller (Vic.), Dr. A. W. Holmes à Court (N.S.W.), Dr. E. Britten Jones (S.A.), Dr. L. S. Latham (Vic.), Dr. Alex Murphy (Q.), Dr. W. S. Newton (Vic.), Dr. S. V. Sewell (Vic.), Colonel A. S. Walker (N.S.W.), Lieutenant-Colonel Ian J. Wood (Vic.); Substitute Councillor, Dr. F. J. Niall (Vic.).

By unanimous vote of the general body of Fellows, Mervyn Archdall, M.D., F.R.A.C.S., was elected a Fellow of the College under Article 40 of the Articles of Association which provides for the nomination by the Council for election as Fellows of such persons as have in the opinion of the Council sufficiently distinguished themselves in any branch of medical science or internal medicine.

The following candidates were admitted to membership of the College: Dr. Jean Armytage (N.S.W.), Major S. J. M. Goulston (N.S.W.), Captain G. V. Hall (N.S.W.), Flight-Lieutenant C. B. Hudson (N.S.W.), Squadron-Leader James Isbister (N.S.W.), Dr. G. S. Procopis (N.S.W.), Major H. J. B. Stephens (Vic.), Captain Helen Taylor (N.S.W.).

The next meeting of the College will be held at Melbourne in or about September, 1944.

Correspondence.

DERMATITIS DUE TO SULPHONAMIDES.

SIR: Your "Current Comment" on the above subject (THE MEDICAL JOURNAL OF AUSTRALIA, May 6, 1944, page 416) was very opportune. A few actual cases are often more impressive than general statements, but, before giving my two instances, I should like to reiterate to readers that there are in connexion with these drugs two kinds of sensitization, one to light and the other a true allergic phenomenon. Both may coexist in the one patient. Of the two, the latter is by far the more important, and I am entirely in agreement with you that the sulphonamide drugs must not be used for trivial lesions, especially if the latter can be treated satisfactorily by other agents (for example, impetigo by mercurial antiseptics). Sensitization to sulphonamides seems more likely to occur as a result of local application, especially to the skin, that by internal administration. It will not profit a patient to cure his impetigo by sulphonamides if you sensitize him to the drug (and incidentally to the whole group) and thereby gravely prejudice his chance of recovering from a subsequent pneumonia or streptococcal septicæmia. There is, however, still another aspect to the problem. This is that the very first application or internal administration of sulphonamides to a patient with eczema is often extremely irritating or even dangerous. It remains to be proved whether this will turn out ultimately to be a very rapid sensitization toward a new irritant in a patient already sensitized to other agents. Here are two instances of this phenomenon.

CASE I.—A young man, about twenty-five years of age, developed a moderate *"dermatitis eczematosa"* from handling antiseptic solutions in the course of his work. He was improving slowly but steadily under local dressing with plain zinc cream and avoidance of all active chemical agents when a relation, who was a medical man, thought he would try the effect of sulphapyridine powder on the eczematous surface. Within twenty-four hours the area was acutely œdematous and weeping. The eczema spread rapidly, till in three days it involved nearly the whole surface in a dangerous exfoliative dermatitis. The patient recovered, but might easily have died.

CASE II.—A middle-aged man had suffered from eczema of the face and neck for some months. A medical man, not his regular attendant, made an erroneous diagnosis of erysipelas, though the patient had no rise of temperature or feeling of illness. Sulphanilamide was ordered in full doses and (within twenty-fours hours again) a terribly acute exacerbation and spread of the eczema occurred. Fortunately his regular medical attendant was called in at once, and, being thoroughly alarmed, immediately forbade further exhibition of the drug, and the patient was spared the worst effects.

Two lessons, in addition to those provided by your own article, seem to me to become obvious from the two cases quoted above: (i) Never apply or give sulphonamides to a patient whose skin eruption may reasonably be suspected of being eczematous in nature. (ii) Never make a diagnosis of erysipelas in the absence of pyrexia and general illness of the patient.

I understand that in the American Army and Navy it is now forbidden to use the sulphonamide drugs unless there is a serious threat to the patient's life. It is to be hoped that similar prohibition will follow in British and Australian medicine—*Primum non nocere.*

Yours, etc.,

E. H. MOLESWORTH.

Beanbah,
235, Macquarie Street,
Sydney.
May 8, 1944.

PERIARTICULAR FIBROSITIS OF THE KNEE AND THE VALUE OF LOCAL ANALGESIA.

SIR: In your issue of April 1, 1944, I read with great interest in an article entitled "Periarticular Fibrositis of the Knee and the Value of Local Analgesia", by Captain M. Kelly, the report of Case I, Lance-Corporal N., in whom infiltration with local anæsthetic relieved symptoms at the time, but produced no cure.

Most of the cases of fibrositis and minor sprains I have treated produced a similar result to the above, whether from wrong technique or the use of a solution of procaine 1% with adrenaline in the majority. All of these failures, following an initial period of elation during the duration of the analgesia, returned within twenty-four hours bitterly complaining of increased pain and incapacity and were not inclined to repeat the treatment.

There were, however, two notable exceptions to these cases, both complaining of pain, radiating to the fingers, in the region of the right lateral humeral epicondyle, accompanied by spasm and great incapacity. The symptoms resulted from suddenly and continually, without previous use, working with tools requiring a continual twisting movement, namely, a screw-driver. A central spot of tenderness, three-eighths of an inch distal to the epicondyle, over the head of the radius, could be elicited, and was infiltrated with two cubic centimetres of procaine 1% solution with adrenaline. Pain and tenderness, with a resumption of the full range of movement, disappeared immediately, but with each patient I was called out of bed that night to alleviate a severe throbbing pain arising in the treated area, and which required morphia for relief. Subsequently the area remained painful and swollen for three to four days, and symptoms and signs subsided with rest, radiant heat and local applications as treatment.

On the subsidence of symptoms, a small, hard, fibrotic nodule one-eighth of an inch in diameter could be felt at the site of the original tenderness. After a lengthy course of persuasion each patient consented to a further injection, and a week after the first another two cubic centimetres of procaine 1% solution with adrenaline were injected into the nodule, which gave appreciable pain when the hypodermic needle entered it. The nodule immediately became painless, but within twelve hours another similar but milder secondary reaction set in, together with a second and wilder barrage of reproaches. This reaction subsided in three days, with disappearance of the nodule and all symptoms, which up till six months later had not returned.

These two cases were amazing in their similarity of the site of the lesions, symptoms and reaction to treatment, even down to times. In view of the commonness of the above type of lesion, it is felt that the notification of these two cases of fibrositis of the common extensor muscle origin of the forearm and their reaction to treatment may be of some interest to those called upon to treat the condition.

Yours, etc.,

KEITH F. D. SWEETMAN,
Flight Lieutenant, Royal Australian Air Force.

April 26, 1944.

THE BRITISH GOVERNMENT'S "WHITE PAPER" ON A NATIONAL HEALTH SERVICE.

SIR: The lack of comment in your correspondence columns on the recently published summary of the British "White Paper" is surprising. The scheme as suggested represents a triumph for the traditional British genius for compromise. Hostile criticism has been anticipated and averted by a catholic approach to the problem. All tastes have been catered for. Private fee-for-service practice is safeguarded, both within and without the scheme, and "individual initiative" within the scheme is further provided for by the so-called "separate" practitioners functioning under a panel system, although, happily, the abuses of this pernicious

method of practice are to be controlled somewhat by restriction of the number on the panel. Finally the much needed advance in medicine, namely, group practice, is to be established, and as the paper points out, the only rational method of establishing a group is under the salaried principle. There is no question of compulsion, and there is to be no revolutionary or sudden change-over. The groups are to be gradually established. So far then, the most die-hard opponent of change should be reasonably satisfied. The position, however, with regard to disciplinary control of professional activity is not quite so clear or satisfactory. One would like to see it stated more unequivocally that disciplinary control of a scientist in scientific matters should be in the hands of his peers.

Yours, etc.,

L. E. HEWITT.

10, Erskineville Road,
Newtown,
New South Wales.

May 8, 1944.

PREVENTIVE MEDICINE.

SIR: I have read with extreme astonishment and regret the presidential address on preventive medicine delivered by Dr. G. C. Willcocks at the annual meeting of the British Medical Association on March 30, 1944.

I fear that his "point of view" places him in the very category that he claims to deprecate, namely, those "who think of it as the preventive medicine of 100 years ago".

On the other hand, on behalf of my colleagues in the public health services, I categorically state that we do not think of preventive medicine only as "the control of infectious disease and drains". Surely a man holding such a high position in our association should be cognizant of the wide and varied field of the activities of the public health officer, who, as a rule, has had experience in general medicine, but later, as a result of the practice of his profession, has realized that many of the ills affecting mankind which he endeavours to cure, could, with intelligent understanding and extra post-graduate study, together with the willing cooperation of the body politic based on knowledge as a result of his propaganda, be prevented.

Public health is not only a matter of drains. It includes the study of maternal and child welfare and nutrition; epidemiology, ranging, shall we say, from malaria and mosquito control, rats and Weil's disease in the canefields to typhus fever and plague in our cities; sociology, housing and environment and all the influences on disease which these portend; tuberculosis and venereal disease prevention; pure food control, with its specialized knowledge of chemistry and bacteriology; milk and water supplies and sanitation (drains) with their effect on the incidence of the intestinal group of diseases; industrial hygiene, and the many extra activities in community life in which we play an active part. In fact the scope is limitless.

The public health officer may not enrich himself in worldly possessions, a fact which seems, in certain medical circles, to call for disparagement and the creation of a superiority complex, but he certainly gains in experience far beyond that obtained in the limited sphere of general practice, and this he endeavours to apply to the fullest extent permitted by government and the good will of his colleagues outside the service towards the elimination of the malign influences which produce dis-ease in mankind.

Yours, etc.,

J. GRAHAME DREW,
Metropolitan Medical Officer of Health.

Department of Public Health,
Sydney,

May 11, 1944.

PSYCHOSURGERY.

SIR: I have read with interest the leading article on psychosurgery appearing in the issue of the journal dated May 6, 1944, and note your comment that "if statistics alone are to be the guide, then lobotomy is to be recommended and practised in every mental hospitals department". If, however, such statistics have been compiled as a result of "pictures produced by enthusiasts" and coloured by "a good deal of preconception and emotional bias", which I think will be generally conceded, then we are far from justified in accepting such statistics as the basis for a recommendation that lobotomy be practised in every mental hospitals department. As suggested, there will certainly be need for the surgeon undertaking the work to have more than a nodding acquaintance with mental disease and its assessment, but I do not think it is reasonable to expect him to shoulder the whole responsibility for what he does, even if he does do "the cutting". This must equally be shared by the alienists or psychiatrists, who are expected to have a full knowledge of the history and clinical course of the patient's malady and who select, on whatever the individual criteria may be, the particular case for operation.

An important aspect in connexion with this operative procedure, especially from the administrative point of view, is the legal one, which is not referred to in your article of the above-mentioned date. In British speaking communities it has long been the practice to subject all surgical procedures of a mutilating character, that is to say, in the sense of interference with or destruction of the individual's personality, to common law provision and control. The question naturally arises, not only as to the extent of legal responsibility of the professional persons involved, but also as to the legality of subjecting to such procedure persons incapable of giving rational consent, under whatever conditions as to suitability for selection might at the moment be in vogue.

It might be well to mention here that the procedure has been described in responsible authoritative quarters as a form of surgical sadism, but even if this be an example of the emotional bias mentioned in the article, one should also take cognizance of the results of recent studies in the correlated fields such as electroencephalography. These reveal very clearly the importance of the integrity of the frontal lobes in the stability of cerebral function and especially so in the case of the suprafrontal gyrus.

The article in question will, I feel sure, be read with great interest by all those professionally concerned with cerebral function generally and with no less appreciation of the temperate and logical conclusions expressed on such a difficult subject.

Yours, etc.,

GREY EWAN,
Director of Division of Mental Hygiene.

Department of Public Health,
52, Bridge Street,
Sydney.

May 11, 1944.

LARGE SULPHONAMIDE DOSAGE.

SIR: I submit for publication the following case which I believe to be remarkable for the quantity of sulphonamides used without producing the more common toxic effects.

A male, aged twenty-five, was admitted on October 29, 1943, suffering from a compound depressed fracture of the frontal bone and cerebral irritation. The depressed piece of bone was elevated and the patient given sulphapyridine, one gramme four hourly, prophylactically. He remained irritated for several days, but gradually improved, until, on the eleventh day, whilst still having sulphapyridine, he developed a severe meningitis.

The cerebro-spinal fluid at first showed a mixed culture of meningococci and pneumococci, but, after forty-eight hours, during which sulphathiazole was given, the meningococci were excluded.

During the next fifty-two days the patient showed two recovery phases, each lasting several days, during which the clinical manifestations of the disease were almost absent, but pneumococci could still be cultured from the cerebro-spinal fluid. The patient was maintained on sulphonamides in increasing dosage, but on each occasion relapsed, and death occurred on January 2, 1944.

In nine weeks of continual administration, the patient was given 536 grammes of sulphapyridine (including intramuscular sodium sulphapyridine), 250 grammes of sulphamethazine, and 45 grammes of sulphathiazole, a total of 831 grammes. The patient at no time showed toxic reaction to the intensive sulphonamide therapy: the white blood count was never below 6,000, the red blood count never below 3,000,000, there was no hæmaturia, and vomiting was only marked in the acute stages of the infection.

At autopsy, extensive basal cerebral abscesses were found.

It is suggested that the lack of toxicity may partly be accounted for by one of the following factors: firstly, as unfortunately no record was obtained of the concentrations of the sulphonamide in the body fluids or fæces, it may be that the alimentary tract failed to absorb large quantities of

the drug; secondly, that the patient's large fluid input may have aided unduly rapid excretion; and finally, that early formation of pus produced increased nullification of the sulphonamides.

Yours, etc.,

G. E. W. BENNETT,
Regimental Medical Officer, Prince Henry's Hospital, Melbourne.

Undated.

Naval, Military and Air Force.

CASUALTIES.

ACCORDING to the casualty list received on May 13, 1944, Major G. E. Jose, A.A.M.C., Woodville, South Australia, who was previously reported missing, believed deceased, is now reported deceased, cause unknown.

Nominations and Elections.

THE undermentioned have applied for election as members of the New South Wales Branch of the British Medical Association:

Sturrock, William Douglas, M.B., B.S., 1938 (Univ. Sydney), NX450, Major W. D. Sturrock, 113th Australian General Hospital, Australia.

Symons, Cedric York, M.B., B.S., 1941 (Univ. Sydney), NX111972, Captain C. Y. Symons, 2/7th Australian Field Ambulance, Australia.

The undermentioned have been elected as members of the New South Wales Branch of the British Medical Association:

Emdur, Hyman John, M.B., B.S., 1941 (Univ. Sydney), 1, King Street, Newtown.

Frecker, Brian Eric, M.B., B.S., 1944 (Univ. Sydney), Royal Prince Alfred Hospital, Camperdown.

Gilbert, Cecil Henry, M.B., B.S., 1939 (Univ. Sydney), "Abest", 25, Salisbury Road, Rose Bay.

Hoddle, Neville George, M.B., B.S., 1943 (Univ. Sydney), 70, Telegraph Road, Pymble.

Lusby, Mary Gwenyth, M.B., B.S., 1939 (Univ. Sydney), 113th Australian General Hospital, Australia.

Street, Frederick Neil, M.B., B.S., 1939 (Univ. Sydney), 113th Australian General Hospital, Australia.

Yeates, James Macrae, M.B., 1935 (Univ. Sydney), 41, Hill Street, Toowoomba, Queensland (temporary).

Van Gelderen, Philip William, M.B., B.S., 1944 (Univ. Sydney), Royal Prince Alfred Hospital, Camperdown.

Bland, Campbell Young, M.B., 1937 (Univ. Sydney), Waterfall Sanatorium, Waterfall.

Obituary.

JOHN HEMPHILL RUTTER.

WE regret to announce the death of Dr. John Hemphill Rutter, which occurred on May 7, 1944, at Yarram, Victoria.

HEZLETT HAMILTON MARSHALL.

WE regret to announce the death of Dr. Hezlett Hamilton Marshall, which occurred on May 10, 1944, at Woollahra Point, New South Wales.

Corrigendum.

Major T. E. Lowe informs us that an error has occurred in the paper entitled "Hookworm Infestation", by himself and Major H. O. Lancaster, which appeared in the issue of the journal of April 1, 1944, at page 289. In the heading to Table II the amount of fæces should be 0·01 gramme, not 0·1 gramme. The corrected heading should thus read as follows: "Number of Ova Present in 0·01 gramme of Fæces (Stoll Count)."

Diary for the Month.

MAY 23.—New South Wales Branch, B.M.A.: Ethics Committee.
MAY 24.—Victorian Branch, B.M.A.: Council Meeting.
MAY 25.—New South Wales Branch, B.M.A.: Branch Meeting.
MAY 26.—Queensland Branch, B.M.A.: Council Meeting.
MAY 30.—Federal Council, B.M.A.: Meeting in Sydney.
JUNE 1.—New South Wales Branch, B.M.A.: Special Groups Committee.
JUNE 2.—Queensland Branch, B.M.A.: Branch Meeting (Joseph Bancroft Memorial Lecture).
JUNE 6.—New South Wales Branch, B.M.A.: Organization and Science Committee.
JUNE 7.—Victorian Branch, B.M.A.: Branch Meeting.
JUNE 7.—Western Australian Branch, B.M.A.: Council Meeting.
JUNE 9.—Queensland Branch, B.M.A.: Council Meeting.
JUNE 9.—Victorian Branch, B.M.A.: Legislative Subcommittee. Finance Committee.
JUNE 13.—New South Wales Branch, B.M.A.: Executive and
JUNE 13.—Tasmanian Branch, B.M.A.: Branch Meeting.
JUNE 16.—Victorian Branch, B.M.A.: Ethics Subcommittee.
JUNE 19.—Victorian Branch, B.M.A.: Hospital Subcommittee.
JUNE 19.—Victorian Branch, B.M.A.: Finance Subcommittee.
JUNE 20.—New South Wales Branch, B.M.A.: Medical Politics Committee.
JUNE 20.—Victorian Branch, B.M.A.: Organization Subcommittee.

Medical Appointments: Important Notice.

MEDICAL PRACTITIONERS are requested not to apply for any appointment mentioned below without having first communicated with the Honorary Secretary of the Branch concerned, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

New South Wales Branch (Honorary Secretary, 135, Macquarie Street, Sydney): Australian Natives' Association; Ashfield and District United Friendly Societies' Dispensary; Balmain United Friendly Societies' Dispensary; Leichhardt and Petersham United Friendly Societies' Dispensary; Manchester Unity Medical and Dispensing Institute, Oxford Street, Sydney; North Sydney Friendly Societies' Dispensary Limited; People's Prudential Assurance Company Limited; Phœnix Mutual Provident Society.

Victorian Branch (Honorary Secretary, Medical Society Hall, East Melbourne): Associated Medical Services Limited; all Institutes or Medical Dispensaries; Australian Prudential Association, Proprietary, Limited; Federated Mutual Medical Benefit Society; Mutual National Provident Club; National Provident Association; Hospital or other appointments outside Victoria.

Queensland Branch (Honorary Secretary, B.M.A. House, 225, Wickham Terrace, Brisbane, B.17): Brisbane Associated Friendly Societies' Medical Institute; Bundaberg Medical Institute. Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY HOSPITAL or position outside Australia are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.

South Australian Branch (Honorary Secretary, 178, North Terrace, Adelaide): All Lodge appointments in South Australia; all Contract Practice appointments in South Australia.

Western Australian Branch (Honorary Secretary, 205, Saint George's Terrace, Perth): Wiluna Hospital; all Contract Practice appointments in Western Australia.

Editorial Notices.

MANUSCRIPTS forwarded to the office of this journal cannot under any circumstances be returned. Original articles forwarded for publication are understood to be offered to THE MEDICAL JOURNAL OF AUSTRALIA alone, unless the contrary be Stated.

All communications should be addressed to the Editor, THE MEDICAL JOURNAL OF AUSTRALIA, The Printing House, Seamer Street, Glebe, New South Wales. (Telephones: MW 2651-2.)

Members and subscribers are requested to notify the Manager, THE MEDICAL JOURNAL OF AUSTRALIA, Seamer Street, Glebe, New South Wales, without delay, of any irregularity in the delivery of this journal. The management cannot accept any responsibility or recognize any claim arising out of non-receipt of journals unless such a notification is received within one month.

SUBSCRIPTION RATES.—Medical students and others not receiving THE MEDICAL JOURNAL OF AUSTRALIA in virtue of membership of the Branches of the British Medical Association in the Commonwealth can become subscribers to the journal by applying to the Manager or through the usual agents and booksellers. Subscriptions can commence at the beginning of any quarter and are renewable on December 31. The rates are £2 for Australia and £2 5s. abroad *per annum* payable in advance.